

THE PHOTOGRAPHY OF
MOVING OBJECTS

ADOLPHE ABRAHAMS

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Why ask for the moon
When we have the stars?

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THE
PHOTOGRAPHY OF
MOVING OBJECTS

AND
HAND-CAMERA WORK
FOR
ADVANCED WORKERS

BY
ADOLPHE ABRAHAMS, F.R.P.S.

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PREFACE

DURING the past six years I have contributed to the magazines and the photographic press a considerable number of articles upon the photography of moving objects. These have been received with many encouraging expressions of appreciation, and with not a few requests to gather these fragments together with any additions that might be desirable into one handy reference.

To these invitations I have until recently turned a deaf ear, partly because of a reluctance to add to the large number of photographic text-books already in existence and indeed insufficiently read, and partly because the compilation of even so tiny a volume as this is no small undertaking in such scattered *horæ subsecivæ* as can be possible in a busy student life.

But the present flourishing condition of focal-plane photography—a branch which has greatly increased in popularity during the last few years—encourages me to proceed in an attempt to give in as small a space as possible all that I regard as the essentially practical details of this fascinating work. I am aware that this is by no means the first manual that has appeared on the subject; but I venture to think that, whereas my predecessors have utilised most

of their space in enumerating particulars about apparatus and other points which are either interesting to a few only or can be just as well gleaned from manufacturers' catalogues, I have dealt with the matter in an entirely different fashion in endeavouring only to embody those details which I have learned from personal experience to be important.

In conclusion, this little book is presented with confidence to a public whose sympathetic reception of my earlier writings I can gratefully acknowledge. It is inevitable that the essence at least of much which now appears will be familiar to readers who may have read the series of articles which have from time to time appeared in the photographic journals. I desire to express my gratitude to Mr. F. J. Mortimer, the Editor of *The Amateur Photographer and Photographic News*, and to Mr. R. Child Bayley, the Editor of *Photography and Focus*, for their generous permission and encouragement to utilise the material of such articles as have been published in their respective journals.

I have also to acknowledge my indebtedness to the proprietors of *The Badminton Magazine* for their kind permission to reproduce several photographs of which they have the copyright.

ST. BARTHOLOMEW'S HOSPITAL,
LONDON, May 1910.

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THE PHOTOGRAPHY OF MOVING OBJECTS, and

HAND-CAMERA WORK FOR ADVANCED WORKERS



CHAPTER I.

INTRODUCTION.

NOT a little difficulty has been experienced in the selection of a title for this little work. “‘Instantaneous’ Photography” includes a word which suggests to me nothing more than a convenient makeshift invariably to be employed with inverted commas; “Focal-Plane Photography” would alienate the sympathies of all who do not possess such a shutter; whilst to name my book “The Photography of Rapidly Moving Objects” or “High-Speed Photography” would involve me in a more or less plausible argument when motion ceases to be slow and becomes rapid.

And yet my final choice, “The Photography of Moving Objects,” would at first blush appear to be the worst of all, and I would seem to be figuratively asking for trouble in adopting so comprehensive a title. But my selection was made in a moment of cunning, in a sudden appreciation of the strength underlying my weakness. So great a number of moving objects come into the scope of photography that

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a courageous attempt to include the majority, instead of remaining content with a timid and meagre restriction to a few, disarms criticism about those which are not considered. Of whatever sins of commission I may be guilty I am at present happily ignorant, but of many sins of omission I am only too conscious. If you want to realise the number of motile objects on earth, in the water, and in the air, amuse yourself by compiling a list starting with comets and concluding with beasts which crawl. I have made such a list, and it soon ceased to be amusing when I reflected that they all ought to have been photographed by me if I presumed to write about them. To take only one category of moving objects, those which can be included under "Sport," I have counted no less than ninety distinct subjects, and the odds are that I have missed several.

But glance at the imposing array of writers who have collaborated to produce *The Encyclopædia of Sport*, and I think you will agree that it would be harsh indeed to judge my little book as if it were an encyclopædia of moving objects and their photography.

And yet, despite this convenient defence and although omissions are admittedly many, I am rash enough to assert that there is not a great deal which is really essential that has been left unconsidered.

For the first exclusions are those moving objects which, on account of their extreme rapidity, are not amenable to ordinary photography, and similarly at the other end of the scale I have not hesitated entirely to ignore as unnecessary any "hints" about objects which move so slowly that their photography is self-evident.

Again, a considerable number of moving objects become rejected for one or both of two reasons—their practice

indoors in a light which renders shutter-work under ordinary conditions impossible, or the nature of their movement which will not permit the photographer to demonstrate evidence of motion. As examples of the first class I may mention *fives*, *racquets*, and *tennis*; of the second class *bowls* and *croquet*, whilst *billiards* comes under both these categories.

Similarly, *boxing* and *fencing* are in general unachievable to the amateur, as on very few occasions do they occur in the open air. Finally, I have avoided all mention of a few moving objects which are either almost entirely extinct or whose interest is slight on account of their localisation to a few isolated parts of the world.

In a book of this description some mention of the *cinematograph* is obviously necessary. I feel that it does not come within the scope of the ordinary amateur, and it is a variety of photography which may be legitimately regarded as *sui generis*. If the cinematograph became universally possible there would certainly be no need for this book, for the essential principle in the photography of moving objects is to expose at a critical instant, and the cinematograph would not merely reduce skill to a minimum but would even obliterate it entirely. The selection of these critical instants and the development of the skill necessary to obtain them are such charming occupations that I trust I shall not be accused of want of progression when I hope that the cinematograph will never become universally popular.

The arrangement I have adopted in this book is first to deal with topics which are general to "instantaneous" work. The early chapters, if elementary, contain at least all the details which I regard as essential; the succeeding general chapters are in a measure more advanced, but are

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placed early in the book to avoid troubling the reader with frequent references. After these general considerations I take up one by one groups of moving objects, selecting for the substance of the chapter an important and comprehensive subject and enumerating at the end these subjects which are analogous to the one which is considered in detail. In these chapters repetition of matter which refers generally to "instantaneous" work has been avoided except when inevitable for the sake of clearness, and only specific details are mentioned.

I am well aware that many of the hints which I regard as "practical" may evoke a cynical smile from the *cognoscenti*, and may appear quite unnecessary to the beginner who has not yet experienced the difficulties of the work. But it is just this very practical attitude which I regard as the most valuable feature of the book. For example, advice is frequently given on the necessity for self-obliteration. One is almost ashamed to feel it necessary to dictate that the photographer who would depict sporting subjects—and very few moving objects are not comprised under "sport"—must be a gentleman first and a photographer afterwards, and I feel that I cannot conclude my introduction to him more appropriately than with the injunction to "*play the game!*"

The most glaring omission that occurs to me is the absence of any mention of things which fly, a deficiency which is rendered the more obvious by the present prominence of *aéronautics* and aviation. I hope that in a future edition the omission may be rectified; and although the resources of space have even now been strained to the uttermost, some room may be found, possibly by the exclusion of matter which criticism suggests to be unnecessary.

I cannot conclude without a reference to the illustrations, which I regard as by no means the least important feature of the book. It was impossible to include a characteristic picture of even the majority of subjects, and those which are included have been carefully selected not so much to exhibit the skill possible to the experienced photographer as to afford examples of what I consider should be a photographer's aim regardless of popular opinion; and almost every illustration plays its part in emphasising or elucidating points in the text.

CHAPTER II.

APPARATUS.

THIS little work is not intended to be an elementary text-book on photography in general. If it presumes almost complete ignorance of the methods of photography of moving objects, it also presumes an acquaintance with fundamental principles for which there are special text-books, not to mention the admirable articles for beginners that appear in the weekly photographic journals. In this chapter I shall point out the essential details regarding apparatus peculiar to my branch of photography, and for further guidance I can recommend the excellent comprehensive catalogues of manufacturers. Actual purchase may then be left to the purse of the individual or to his own prejudices, which no amount of argument on my side would alter.

A great deal of this work will more or less suppose the possession of a focal-plane shutter, and I do not hesitate unreservedly to advise that any new camera purchased should have one fitted. I take it for granted that everybody who is interested in photography is acquainted with the system and advantages of the focal-plane shutter; at any rate, I shall not utilise any space to describe it, but remind the interested reader that the subject has been exhaustively treated on many occasions by many writers.

Although I am anxious to cater for the amateur with a lens shutter only, I warn him that he will find his opportunities very restricted with a mechanism whose minimum exposure, a reputed 1-100th sec., is often 1-40th sec. at fastest. For anyone who is "going in strong" for the photography of moving objects a focal-plane shutter and a rapid lens are *sine quibus non*.

THE CAMERA.

To consider the question of cameras specially employed for such photography, two only are in frequent use—the folding type of hand camera, of which the Goerz-Anschutz is a familiar example; and the reflex, of which many excellent varieties are on the market.

These two types of camera have been compared and contrasted almost *ad nauseam*. There is practically only one advantage of the reflex, but what an advantage it is! The principal difficulty in the photography of moving objects is to attain accurate focus, for, no matter how skilfully you have timed your exposure, it will be only a mortification if it is out of focus. Many subjects are experienced when focussing almost at the last moment is a desideratum, so that on the whole the reflex is of very great advantage.

It is, however, only fair to concede that it is quite possible with the folding type of camera to focus upon a fixed point beforehand with perfect accuracy, and it is only with subjects for which focussing at the last moment is desirable that this method fails. This is actually the procedure with a reflex, for you must not be misled into the idea that you can focus an object whilst in motion. But it must also be realised that the rapidity with which the most meticulous focussing and composition are effected with the reflex, particularly on

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sudden impulse, is a privilege which cannot be unduly emphasised.

Bearing in mind that the majority of workers will not possess a reflex, the advice is often given to practise judging distances so that the lens can be set to the right focus very quickly. Practise judging distances! The professional pressman can attain accuracy after, if I may believe the opinions of those with whom I have discussed the matter, two years of incessant practice. What chance has the amateur whose photography is only an incident, not the business of life? For a fair approximation is of no use when we remember the slight depth of focus that lenses of wide aperture possess.

The disadvantages of the reflex are only two—its weight and its price. I believe it is not so much the weight as the size that is so objectionable to the *dilettanti*, and in this connection one is reminded that the folding reflex is now a *fait accompli*, although it is still on its trial. The price is a more serious proposition. When you have taken my advice and studied price-lists, you will be bewildered by the remarkable disparities. Some offer a complete camera with slides and lens and all sorts of accessories for about half the price of another without lens at all. I do not feel it within my province to advise any particular make, and I will only say that in purchasing a reflex you will get value for every penny you spend, whatever the amount. I trust the reader will understand this somewhat cryptic advice.

One final warning. Don't think that the reflex represents a highly specialised complicated instrument for the expert, and that a novice should buy other cameras and by gradual stages evolve into a reflex-man. Anyone who will face the expense should buy one straight away. The battle in

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THE 1910 CAMBRIDGE EIGHT AT PUTNEY.

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"A BIG FIELD."

shutter work consists in establishing a complete sympathy with your camera until it becomes a part of yourself. This leads me to destroy one other misconception. It is argued that it is difficult to "time" accurately with a reflex. Nothing of the sort; the most perfect timing is possible—a point I have considered in detail in the chapter on "The Science of 'Snapshotting.'" It is also objected that the reflex gives the view from waist level, not from eye level. The difference is in general negligible, and I am often amused by seeing the very people who advance this objection *kneeling down* when using their ordinary hand cameras. To come to essential details—whatever your camera, the focal-plane shutter should fulfil the following requirements:—

It should be really *in the focal plane*; some badly built instruments have the shutter in the body of the camera, nearly an inch from the plate.

It should, so far as possible, operate *without noise*; a well-made shutter must have at least "a whisper," as one enthusiastic manufacturer puts it: what is of much more importance is that there should be no vibration.

Its *speeds* should not be limited merely by the existence of a few slits of different sizes, but it should work satisfactorily from about 1-5th sec. through a wide range up to the regulation 1-1000th sec. More is said regarding speeds of shutters in the chapter on "Exposures" (Chapter III.).

All the *adjustments* should be from the outside, and a quick-wind is preferable, even if not of vital importance. The tension of the spring by which the blind is driven should be generously large, and in the best type of shutter change of speed is effected by simultaneously increasing the tension as the slit becomes narrower. If your camera is not a reflex, a "self-capping" shutter is of great advantage.

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The *release* should be firm. I would rather see one on the "hard" side than an unstable concern which went off at the least touch. A good type of release is a lever which is depressed by firm pressure of the thumb. Some workers prefer a bulb release ; I do not.

If your choice has fallen on a reflex, be sure that the shutter release *does* send up the mirror and release the shutter promptly. I have worked with bad reflexes in which, unless a tremendous push was given to the release, the mirror went up, but the shutter failed to move.

That release and focussing-screw should be on opposite sides of the camera is evident, but there is actually some difference of opinion as to which side should possess which. I cannot understand why. Turning a milled screw is ever so much more of a refined movement than pressing a release, and the right hand (except in left-handed or ambidextrous persons) is surely the one to employ. So have your focussing-screw on the right-hand side, and the release on the left, and preferably low down. In a folding type of camera it is best to have the release on the right-hand side, since the right is the only working hand throughout.

I need scarcely enter into the other movements of the reflex. The ingenuity of the maker of any high-class instrument will give you all that can, with our present knowledge of camera-craft, be demanded. Many movements are slight advantages making for comfort, and are reasonably to be expected if a big price is paid. For example, a revolving back is regarded as a matter of course, but it will be found that a very great proportion of your pictures will be with the longer side of the plate horizontal, and many pressmen do not trouble at all about the vertical position.

But I must make a direct reference to a few important

details. It is absolutely essential that the handle should be on the top of the camera. Not only is the camera most easily carried from this position, but often you will find it necessary to be ready with your camera open and shutter set, prepared for any sudden event. If the handle is on the side, it is probably in dangerous proximity to the shutter release, which may be involuntarily manipulated, spoiling a plate and, of course, the chance of a picture. Be sure that your camera allows ample extension for the use of a long-focus lens, and even for some telephoto adjustment.

The swing-lens is an accessory now seen fairly frequently on the reflex. I do not know if other types of focal-plane cameras will adapt it. I have devoted an entire chapter to its uses (Chapter VI.), and need do no more than mention it here.

Many manufacturers fit magnifying glasses into the focussing-hood, and these are often supplied according to the prescription of a customer whose sight is not normal. The myopic user I would warn against having concave lenses fitted, but he should prefer convex lenses which exactly neutralise his own spectacles. For a myopic person finds it very awkward to focus accurately with concave glasses, and, with convex glasses in the hood, he will thus be enabled to focus as if his spectacles were off, and yet be able at once to transfer his gaze to the subject for which purpose he will need his usual glasses. The long-sighted person with his convex glasses in his hood will not find it necessary to remove his spectacles for looking at the moving object, for which purpose, of course, he needs no glasses.

I may almost anticipate one question from the man who possesses a stand camera and would like to know if I would advise him to have a focal-plane shutter fitted to it. Not

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only do I answer in the affirmative, but I will go further and encourage him, if he does not feel inclined to buy a new shutter, to try his hand with the lens shutter he is sure to possess already. He will be very limited in possibilities, but I am prepared to give odds that he will acquire such a partiality for this branch of photography that he will soon chafe at his limitations and invest in a focal-plane shutter.

Adverting to the question of a tripod camera, one must be warned that the tripod of necessity hampers one enormously. For a few subjects there is no difficulty in utilising a tripod, and indeed beginners hanker after its assistance, which prevents the distraction from attention to the subject, entailed by holding the camera rigid and in the correct position. Any such dependence is a bad habit to acquire; and in general so much work has to be done in situations where a tripod is inadmissible, and in most cases its adoption hampers to such an inordinate degree, that nobody who contemplates serious shutter work should purchase a camera which is not of the "hand" variety, which, after all, can on occasion be erected on a tripod.

The question of *finder* is an important one for all hand cameras other than the reflex. Need I mention that this accessory should never be used for any other purpose than "composing"? To view your moving object in a finder is simply courting disaster. This holds good even with a reflex in which the ground glass acts as a finder, which has the additional advantage of enabling accurate focussing to be accomplished; for with a reflex, as with all cameras, exposure is made whilst the subject is *directly* observed. I ought perhaps to say that this dogmatic assertion regard-

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SEVENTY MILES AN HOUR!

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MOTOR-BOAT RACING ON THE THAMES.

ing the reflex does not apply to absolutely every subject, but to so overwhelming a majority that I speak for convenience as if it were universal.

The exception, which here proves the rule, is the cross-lines finder which is used like the sights of a gun. It is a finder of which I heartily approve, for it enables one exactly to see the extent of the available field as if in a frame, and also to watch the subject directly with great accuracy. I have even had one fitted to a reflex camera, but I found it difficult to hold the camera in a position in which I could utilise it.

Plate-holders need not detain our attention long. A *changing-box* is almost a necessity on account of the convenience of carrying a dozen plates (or even two dozen films), and there are many occasions when a dozen will be rapidly exposed. It has its disadvantages, one of which—a small one perhaps—is inconvenience in the removal of any particular plate without disturbing the remainder, and the purchaser of a changing-box must in addition have a couple or more dark-slides. A very excellent arrangement which combines the advantages of changing-box and slides is the *Mackenzie-Wishart slide*—a form of plate-holder which is adopted by almost all professional pressmen. Its mechanism is so well known that description is unnecessary. So far as I am aware, its sole disadvantage is that *all* camera backs are not suited to its adaptation until a certain amount of the metal work has been cut away. One camera manufacturer at least, has very strongly dissuaded purchasers from taking this risk of letting in light. However, this may apply to very few cameras, and the Mackenzie arrangement is so very convenient that I would advise you, on purchasing your camera, to ask the maker's opinion upon fitting it.

THE LENS.

By way of introduction to this very important subject, I will say that during the last six years, I have not made more than a dozen exposures with a lens of wider aperture than $f/6.3$, although I have attempted very high-speed shutter work right through the winter months. The few exposures made with a "more rapid" lens have been mainly in the nature of trials. I am prejudiced against lenses of very wide aperture for the photography of moving objects—I am speaking, of course, of ordinary work, not of cinematography with lenses of very short focal length—because the difficulty of using them is too great.

The majority of your work will be done at fairly close quarters on subjects in which a reasonable depth of focus is essential. A lens say of $f/4.5$ with a conveniently long focal length has a very slight depth of focus: it is useful, no doubt, for work on single figures, but even then your focusing has to be performed with such exaggerated care that it becomes a positive nuisance. Two of my illustrations show single figures only, and yet the comparatively slight depth of focus required was not within the limits of $f/4.5$. Thus the back of the hoop in the photograph which faces page 129 and the club-head in the photograph which faces page 96 are not sharply defined. In both cases the subject's face was focussed, and I am convinced that the rest of the picture is out of focus, and the blurring is not due to an insufficiently rapid shutter. Of eight professional pressmen with whom I discussed this matter, two only were in the habit of using a lens of what I call very wide aperture; one admitted that he chiefly utilised it for indoor photography, the other aimed at full exposure on small

figures at a distance. The rest agreed with me that an aperture of $f/6.3$ or thereabouts represents the high-water mark of efficient general use.

The depth of focus which is given by a lens of this aperture which has a focal length of 6 to 8 inches is sufficient not merely to obscure the inevitably small mistakes in exposing a little too soon or too late, but in general to give a sharp rendering of all the figures usually comprised in a photograph of moving objects. On the other hand, an error of even a few inches may mean diffused focus when working at $f/4.5$. I am certain that many beginners do not grasp the significance or importance of depth of focus: they think that because "perfect covering power to the margins," and "good definition" are guaranteed, they need trouble about nothing else. Covering power and definition are the products of the manufacturer's skill; depth of focus is an inevitable property of aperture and focal length.

Seeing that all lenses with the same aperture and focal length have, speaking generally, the same depth of focus, I can imagine someone asking whether it may not be advisable to buy an $f/4.5$ lens and stop it down to $f/6.3$. I would reply in the affirmative if the purchaser can convince himself upon two points: one is that he will find sufficient occasions to justify the use of $f/4.5$ (speaking, of course, only of the photography of moving objects), and not merely be paying extra money for the privilege of stopping it down; the other is that the single components are corrected to act as lenses of long focus.

I believe I am right in saying that until recently you could not obtain a lens of wider aperture than $f/6.3$ with corrected components; and, as the value of a single

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component is so very great in my eyes, almost for this reason alone I used unreservedly to advise the purchase of a lens of this aperture, with the additional opinion that a wider aperture was so difficult to use and so seldom required that its absence was not felt. But one lens at least (Messrs. Watson's Convertible Holostigmat Series 1A) works at $f/4.5$ and has single components which are guaranteed corrected at $f/8.5$. A very enterprising compromise has also been advanced by lens makers who have recognised the value of supplying a lens which has an open aperture of $f/4.5$, and *one* component of which is corrected. Such a combination is obviously a very convenient one, for there is the wide aperture to be employed when necessary, and stopped down when desirable, whilst one long-focus lens is quite sufficient.

Some manufacturers, in an anxiety to give a variety combine two dissimilar components, so that the possessor has three lenses of different focal lengths. I mention this without special attention because the third lens, which gives the medium focal length, is rarely of much use.

So the net result of my somewhat drawn-out discussion on the lens is that in selecting you aim at a focal length of about 6 inches for quarter-plate and 8 inches for half-plate work. I think these focal lengths, whilst the longest for convenience, should not be very much shorter. Its widest aperture will be $f/6.3$, or less according to your prejudices and the influence of my preceding arguments ; all I insist is that one component at least is corrected, and can be adapted as a lens of about double the focal length of the combined lens.

THE PLATE.

Upon this subject I am about to advance another heterodoxy. Surely the fastest plates for the fastest work

would seem to be a self-evident proposition, and, like all beginners, I started with ultra-rapid plates, eagerly welcoming the competition between manufacturers, and patronising always that brand which temporarily held the field as "the fastest in the world." My next advance was to confine myself to one brand, still of the ultra-rapid type; but my work rapidly improved when I turned my back on H. and D. 400, and determined never to use a plate more rapid than H. and D. 250. Of course, ultra-rapid plates have their uses, but, *me judice*, not in the photography of moving objects.

For a long time I made no attempt to explain even to myself the paradox that the slowest plate was the fastest—a paradox which, by the way, I have learned to have been formulated almost before I was born. I had made my "discovery" empirically, but in time I came across the brilliant researches by Dr. Kenneth Mees into the characteristics of the dry plate, and from these obtained a scientific endorsement.

Dr. Mees gives various constants for specifying the character of a plate, among which are sensitiveness, velocity of development, latitude and density-giving power, the last being designated as $\gamma\infty$ (gamma infinity), now quite a well-known symbol. A plate that can be "forced" in development when under-exposed will have a high $\gamma\infty$, and, in fact, of all the constants of a plate, Dr. Mees considers this one to be the most important. For example, if a plate is to be used for extremely rapid exposures, then a high $\gamma\infty$ is far more valuable than a high speed. Dr. Mees contrasts two plates, which, having respectively speeds of 131 and 28.6 H. and D., gave practically identical results with a very brief exposure, and says that slow plates can frequently be used for extremely short exposures, because the high $\gamma\infty$ often

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associated with a slow plate compensates for the low sensitiveness. I am well aware that all other high-speed photographers, including men with at least as much authority as I, do not support this view of the medium plate, and many demand faster and still faster plates. One must be broad-minded; the existence of so many different brands on the market, and all successful, is sufficient proof that entirely different methods may produce equally good results. For even though the general chemical composition of all plates is substantially uniform, the slight differences which different brands comprise may be of sufficient importance to make a plate a complete success in the hands of one worker who has got used to it and a complete failure in the hands of another who does not know its peculiar features.

The moral is to be faithful to one make of plates, to learn what you may and may not do with it.

THE SIZE OF PLATE.

The final note on apparatus is merely a reference to the size of your outfit. The serious worker unhesitatingly selects half-plate and does not grudge the far larger initial outlay and cost of upkeep in view of the advantages. I am not asserting that first-class work is not produced with the quarter-plate size, but it is really impossible for me to write convincingly on the enormously increased scope of the larger plate; you must work, as I have, with both sizes to appreciate it fully. The odd size 5×4 always strikes me as a pusillanimous compromise between the desire to have a bigger picture than quarter-plate and the hesitation to venture on half-plate.

I can only say that the quality of my work markedly improved when I changed to the larger size, not only on

account of the greater possibilities but because the care and thought which are bestowed over the exposure of the larger plate make for improved technique. The quarter-plate worker is relatively indifferent to waste, whilst the half-plate man does not expose so recklessly and obtains a far higher percentage of first-class pictures.

CHAPTER III.

EXPOSURES FOR MOVING OBJECTS.

It is frequently stated that the greatest difficulty experienced by the beginner is the calculation of the exposure necessary for different moving objects. In order therefore to minimise his difficulties he is provided with all sorts of schemes, which vary from a simple table of the commoner moving objects with the corresponding maximum exposures for definite distances from the camera, up to systems which involve more or less elaborate formulæ and even terrible-looking charts bristling with abscissæ, ordinates, and curves.

Every one of these systems depends fundamentally upon the same factors. All are based upon the criterion that a certain displacement upon the plate will not be visible—a displacement which is decided by the focal length of the lens used, the velocity of the moving object, its distance from the camera, and its direction of movement relatively to the camera. One cannot but applaud the sentiment which provokes the attempt to calculate the exposure in such a way—scientific exactitude is always to be applauded; but after all, how futile, how impracticable the whole scheme is!

In the first place, there is not even universal acquiescence regarding the extent of displacement permissible on the

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A QUARTER-MILE RACE: AT THE FIRST CORNER.
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A HUNDRED-YARDS START: "BEATING THE PISTOL."

plate. I have seen authoritative statements which vary between 1-100th and 1-250th inch.

Secondly, although the exact distance of the moving object from the camera may in some cases be ascertainable, yet in almost all cases its velocity cannot be known even with a fair approach to exactness, and only a very rough rule can be given regarding the exposure requisite for varying angles of direction of motion.

Thirdly, no scheme can possibly take into account anything other than direct velocity, and the majority of subjects display additional movements of limbs, etc., which greatly influence the exposure. Thus a racing eight and a runner (not a sprinter) may have exactly equal velocities, but no man of experience would dream of giving both identical exposures.

Fourthly, on how many occasions is there time to effect any sort of calculation

Fifthly, if a calculation *is* made, how impracticable, as a rule, is the fraction obtained—1-211th sec. !

And, finally, even if all my objections can be over-ruled, the shutter itself is in 99 per cent. of cases inaccurate, so that the would-be hypercritic ends self-stultified unless all his errors exactly neutralise one another. To borrow the expressive words of a popular novelist, is it not like firing at an unmarkable target with a defective rifle and uncertain ammunition? The inference to be drawn from this jeremiad is that when photographers do obtain sharp pictures of moving objects it is only by a fluke, or because their exposure has been too rapid. It is generally too rapid, sometimes indeed ridiculously rapid. I believe that these exposures are often given by photographers who have obtained blurred results when dealing with the same subject

on previous occasions and who mistake the diffusion due to inaccurate focussing (perhaps with a lens of very wide aperture) for the blurring which is an evidence of movement during an insufficiently rapid exposure.

My intention therefore is to give no scheme or table of any kind. Instead, I shall point out, subject by subject, the details which indicate relatively rapid or slow exposures. At times I shall be betrayed into giving absolute figures, but I appreciate the fallacy; for how can I say what corresponds in your shutter to what I call 1-400th sec. in mine? If all shutters could be constructed to give accurate speeds, then the matter would be very different.

In fact, every man must teach himself. He will learn more from making half a dozen exposures upon moving objects of definite types and, by observing the results, standardising his shutter, than from perusing miles of writing on the subject. Have your shutter tested by all means. There is no need to worry if its speeds are—to be kind—merely approximate; but what is of real importance is that the different speeds should be relatively accurate—that what is called 1-400th sec. is twice as rapid as that marked 1-200th sec., and so on. I have seen it stated that a fairly well-known shutter had speeds marked 1 sec., $\frac{1}{2}$, $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{20}$, $\frac{1}{50}$, $\frac{1}{100}$ sec., which, when tested, were found to be $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{5}$, $\frac{1}{5}$, $\frac{1}{8}$, $\frac{1}{20}$, $\frac{1}{20}$ sec.

Focal-plane shutters, too, are not free from such inaccuracies. I remember my first exposure with a reflex (a very high-priced one) some years ago. I gave the "1-1000 sec." for a train at close quarters, and the negative depicted a heart-breaking slope of the funnel of the engine. I promptly tackled the manufacturers, and they were candid enough to admit that the shutter's speeds were not by any

means what they purported. "If we really supplied a shutter with such rapid speeds," they explained ingenuously, "such extreme under-exposure would result that the un-experienced amateur would blame the camera and give up using it." They further added that, as I was keen on high-speed work, the camera if returned should have the shutter "timed-up."

These are one or two general remarks upon exposures which may be found useful. The man with the lens shutter must swallow the bitter draught that the already scanty possibilities of a 1-100 sec. will be still further limited by its inaccuracies, which may, however, in some cases be remediable. The focal-plane man must remember that when he is given the option of using a very narrow slit which, with a low spring tension, just wobbles across the plate or a wider slit which is driven rapidly, although it is true that each part of the plate receives the same exposure in the two cases yet the net result is very different. He must always work with a high spring tension. I am glad to see that some focal-plane shutters are now so constructed that the spring tension is not left to the discretion of the photographer, but is automatically increased concomitantly with the narrowing of the slit.

In an endeavour to temper the wind to the shorn, several kind writers have suggested methods to decrease the relative velocity of moving objects, and have even soothed the feelings of the unfortunate who has produced blurred results by saying that evidence of motion adds to reality. Well, anyone who holds this opinion is quite welcome to it; but I warn you that it will be hard to bear the sneers which your "evidence of motion" will frequently excite if you are disposed to regard dicephalous monsters

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or athletes with queer supernumerary limbs as suggesting motion. It is not movement during an exposure which has to suggest motion; the artists aim at depicting an attitude which the photographer can rarely arrest—the single attitude which achieves the suggestion.

As regards the methods to decrease relative velocity, one is advised that counter-movement will often enable you to decrease an exposure—that is to say, if one is travelling in a vehicle exactly parallel to a moving object, the velocity of the latter is relatively diminished and, logically considered, one might sometimes give a “time-exposure.”

But the scheme is impracticable, for the vehicle jolts, swerves, shakes, rolls, or fails to move parallel to the other object; and, so far from diminishing the rapidity of your exposure, you are forced to accelerate it to compensate, for there is now what amounts to two added movements.

Similarly you are told to utilise the “intervals of suspended motion” which occur in some subjects. Thus a diver at the summit of his flight, a golfer at the top of his swing, a lawn-tennis ball at its greatest height in the air during “service,” and even a runner’s foot on the ground, are all stationary for *some* period of time. Very true again, but impracticable. I wonder if any photographer has ever attained such a high degree of accuracy that he could guarantee always to hit off such periods of rest exactly. Further, even if one part is at rest, other parts are generally moving, often with their maximum velocity; and, finally, the subject is hardly likely to be obliging enough to be in the position for sharp focus and the position of suspended motion exactly at the same time.

I cannot conclude this chapter without a few remarks regarding the disabilities of the focal-plane shutter and

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THE FINISH OF THE HUNDRED-YARDS RACE, CAMBRIDGE UNIVERSITY C. THE LONDON ATHLETIC CLUB.

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THE HON. G. W. LYTTELTON PUTTING THE WEIGHT.



MR. R. E. WALKER'S HEAT IN THE HUNDRED YARDS,
A.A.A. CHAMPIONSHIPS, 1909.

the advantage of utilising a lens shutter as far as possible. I believe that a lens shutter with a reputed speed of 1-2000th sec. is at present *sub judice* and, in some parts of the world, is actually on the market. I have not had an opportunity of examining one,¹ but it must be remembered that we shall demand a remarkably high efficiency if it is to compete with and eventually displace the focal-plane shutter, which enables the whole of the light available to be utilised throughout the exposure, even if it is satisfactory in all other respects, such as ease of manipulation and absence of vibration. The worst sin laid to the account of the focal-plane shutter is that it distorts. In principle, of course, there must be distortion if the plate is exposed in portions. It is true that the early shutters were rightly condemned, but, after all, they were only in the experimental stage, and modern shutters are very much more efficient. Imagine a customer in 1910 being informed that his shutter could be guaranteed satisfactory only if used in that position in which gravity could be utilised to assist the passage of the blind!

Only once have I encountered distortion with a good-class shutter, and that was in the case to which I alluded earlier in the chapter. The shutter worked in the usual direction from above downwards, so that the funnel of the engine was the last part of all to be exposed, and, as in all probability, the slit travelled too slowly, the train had progressed sufficiently during the exposure to depict the funnel as leaning forwards. No such distortion can be observed in the engine reproduced (page 20), and this was a pretty severe test, for the express was travelling at 70

¹ By the courtesy of the manufacturers, I am now engaged in making a trial of the shutter.

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miles an hour within 24 feet of the camera. With the intention of obviating or at least of minimising distortion, it has been advised to adapt the direction of movement of the slit to that of the moving object so that during the passage of the slit across the plate it meets the image—or, in other words, the slit is to move in the same direction as that of the moving object. If, therefore, one were photographing a train or other rapidly moving object travelling at right angles to the camera, the slit should be driven vertically in the corresponding direction; if a falling object, the slit should travel horizontally in the usual direction of focal-plane shutters, from above downwards; if a rising object, horizontally from below upwards.

In most cameras the blind is fixed to run in one direction only—almost invariably from above downwards with the slit horizontal. A camera of the folding type might be held in any of the four directions as desired, and in a few (a very few) reflex cameras the shutter is contained not in the body of the camera but in the reversing back, and the same refinement might be adopted; but for the majority, as I once irascibly informed an inquirer who had irritated me to the point of distraction at a lecture, you would have to stand on your head to make the adjustment convenient. My own experience has been that the attempt is not worth consideration, the differences which result being undetectable and the opportunities being on the whole too few. I have in fact only referred to the matter at all out of compliment to two writers who have strongly advocated the precaution and the authority of whose opinions must command respect.

There is one other defect for which the focal-plane shutter has to be blamed. When such a shutter is em-

ployed, usually with a very narrow slit and in bright sunlight, curious longitudinal streaks occasionally appear upon the negatives, consisting of alternate light and dark shading. The focal-plane shutter is clearly at fault, but the actual cause is uncertain. Thus the markings have been attributed to contact of the blind with the plate, to which credence can scarcely be given; to vibration of the blind; to leakage of light in at the sides of the shutter; to irregular edges of the slit, which results in uneven exposure of different portions of the plate; to imperfect parallelism between plate and blind, which seems reasonable, as there would be varying efficiency at different parts of the exposure; or, as is most probable of all, to the tension of the spring failing at the end (although usually assisted by gravity) and causing the last part of the exposure to be longer than the early part.

One used to hear a great deal about the markings, but nowadays no complaints of this kind appear to be made, and I fancy that they were due not to the focal-plane shutter *qua* focal-plane shutter, but to the defects of previous models which have now been remedied so that the modern shutter is a highly efficient and in every way a satisfactory one.

CHAPTER IV.

THE DEVELOPMENT OF UNDER-EXPOSED PLATES.

IF I may venture to hope that any chapter of this book will be read with special interest it is certainly this one. It takes a photographer not a little time to realise that there is no infallible remedy for under-exposure, no specific for inducing to appear that which is not there at all. Often and often do I receive requests for "formulæ," appeals to my good-nature or—for more sinister motives are suggested—offers to purchase secrets. Alas! there is no secret, or at least I do not know it. We all seem to run the gamut of reducing agents, starting with pyro-soda, deserting it for the more flashy pyro-metol, dabbling with eikonogen and hydroquinone, experimenting with glycin and rodinal, and finally returning to our first love, the simple pyro-soda. I think everyone is agreed that for fully exposed plates it is unequalled, and the experience I have attained is that for under-exposure it will on the whole produce better results than any other developing agent. And you have more than my word for this; the professional pressmen endorse my opinion, and they leave nothing to chance.

The means I adopt is simple in the extreme. I make up a solution of sodium sulphite and sodium carbonate, of each 2 ounces to the pint, and I add $\frac{1}{4}$ of an ounce of

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MR. A. C. B. BELLERBY CLEARING 5 FEET 11 $\frac{1}{2}$ INCHES IN THE INTER-VARSITY SPORTS, 1909.



A 22-FEET LONG-JUMP, MR. S. S. ABRAHAMS, C.U.A.C.

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A PUBLIC-SCHOOL JUMPER.

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potassium metabisulphate. As regards the last-named, authorities differ as to the rôle it plays, since if it is only a preservative for the pyrogallic acid it is not wanted here; others maintain that its addition is beneficial in improving the keeping power of the sulphite, and I agree with them.

For development of a half-plate I take 6 drachms of the solution and add 18 drachms of water, warming the mixture to a temperature of 65° Fahr. To this I add 3 grains of pyrogallic acid. In the winter I ensure that the dark-room and all utensils are also kept warmed. Development is slow; constant rocking is essential. For extreme under-exposure I dilute a little further and use 2 grains only of pyrogallic acid. I believe 2 grains represents nearly the minimum capable of effecting reduction. I develop until as much detail is present as is evidently going to appear. If density is insufficient, I build up with another solution, which consists of 1 ounce of the soda solution, 2 ounces of water, and 5 grains of pyrogallic acid.

I have seen it stated that a marvellous effect can be produced by using a developer at a much higher temperature, so much higher that a preliminary bath of formalin is advised to prevent frilling by the hot (!) developer. Of course, a plate cannot be cooked with impunity, and chemical fog soon results: and Messrs. Lumière Brothers' researches have shown that, of all developers which tend with rise of temperature to produce chemical fog, pyro exhibits this propensity in the highest degree. It will be observed that potassium bromide is absent from my formula. This reminds me that a few years ago there was a revival of the use of potassium iodide in developing under-exposed plates. Its sole advantage appeared to be its action as a strong restrainer, thus enabling one to adopt a very

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powerful developer whilst inhibiting the usual tendency to fog. But apparently it was not regarded as a restrainer merely as an alternative to potassium bromide, because both halide salts were included in the formula recommended; and if variety were the only recommendation, the iodide would be prohibited by its much greater cost.

I do not deny that I use pyro-metol. The flesh is weak, and the method of attenuated development I have described needs a great deal of patience, fairly constant attention, and prolonged existence in the unhygienic ruby light. Pyro-metol is so fascinating in the rapidity of its action; up comes the image with both detail and density, and when one is a little tired or lazy or in a hurry with many plates to develop, the meretricious pyro-metol is an easy first favourite. But it is a bad habit, for the resulting negatives, though pretty, are not so good as they look. If you use pyro-metol, you cannot improve on the Imperial Standard formula omitting the bromide. It is indeed a "standard" developer, but you should dilute with an equal quantity of water at least, and great dilution is no disadvantage, provided you retain the minimum quantity of reducing agent in your solution. I have seen it advised to add sodium sulphite to the "B" solution to prevent yellow staining of the negative. I think this yellow stain should be encouraged, and that its absence from a negative which has undergone prolonged development is an indication that there is too much sulphite in the solution.

For fully exposed plates—and even fast-shutter exposures may be fully or over-exposed—pyro-metol should certainly be avoided. Thus the picture of the racing eight which faces page 60 would have been perfect if I had not through desperate hurry developed with pyro-metol. Take

as a contrast the "bunker" picture which faces page 81. It received 1-450th sec. at $f/8$ (this stop was inadvertently used) in dull light—in fact, in a heavy shower of rain. It was developed very slowly, perhaps with obstinacy rather than patience, with dilute pyro-soda, and although a close observation shows that it was clearly "forced," yet it is a good enough negative for almost any purpose.

It is not a bad plan to use pyro-metol as a strengthening medium after all possible detail has been coaxed out with pyro-soda.

This prolonged development at raised temperatures supposes a plate which will not resent "forcing," and that is my reason for advising one of the extra-rapid speed, for most ultra-rapid plates give up a ghost indeed if immersed in a solution a degree above 60° . But, if a platitude, it is certainly a very true one that you should stick to one plate and experiment with it until you find how you can best deal with it. My advice is merely to describe the plate and the method I use which in my experience is better than any other.

We may just for the sake of completeness glance at the other developing reagents. Metol-hydroquinone is favoured for its cleanliness (of operator's hands as well as negatives). I do not advise it; but if you are persuaded to use it, remember that in winter warming is absolutely essential, for hydroquinone is almost inert at low temperatures. Eikonogen-hydroquinone was a popular combination for shutter work many years ago. I have not had much experience of it, but believe it to be preferable to metol-hydroquinone.

Stand development, for which glycin and rodinal are most suitable, is the method of tentative development to an extreme extent. I do not recommend it. I am not con-

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vinced that better results can be produced by great dilution ; unlimited time is required, as, even with the comparatively slight dilution I adopt, an hour's development is not unusual ; and, finally, I like to give individual attention to negatives instead of messing about with the large quantity of solution necessary to fill a tank.

In conclusion, I must admit that in avoiding factorial development I would appear to be contradicting Mr. Watkins, for by his method the best results are said to be obtainable. But it must be remembered that focal-plane men do not claim to produce perfect negatives ; they aim only at producing negatives most suitable for their purpose.

CHAPTER V.

THE USE OF THE LONG-FOCUS LENS.

LENGTH of focus is obviously a relative term ; but, as it is pretty generally agreed that six inches for a quarter-plate and eight inches for a half-plate represent the focal lengths in general use, it is fair to regard any length greater than these as "long focus."

I am not breaking new ground in contributing this chapter, but I am convinced that nobody has written sufficiently to novices upon this subject ; and although the uses and advantages I shall describe were appreciated long before I possessed a camera at all, yet some of my early results were described by lens makers as a revelation to *them*, encouraging me to do more of this sort of work perhaps than any previous amateur.

A long-focus lens gives a larger image than a short-focus lens used from the same position. It will therefore enable you to obtain a large picture of an object which with a lens of short focus would be comparatively inconspicuous if for any reason it is impossible for the camera to approach nearer the object in question. A long-focus lens will also give a better rendering of perspective, and its resulting picture is therefore artistically more accurate. Bearing these details in mind, I divide the uses of a long-focus lens into *obligatory* and *optional*.

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To the project of purchasing a long-focus lens of wide aperture (say 16 inches at $f/6$) there are three objections—the size of such a lens, requiring on some cameras a special support, its price, and its lack of depth of focus. A man who could afford to buy a whole battery of lenses might include one of this type, but probably 99 per cent. of amateurs will be able to purchase one lens only, and that is why I have emphasised the necessity for purchasing a lens one single component at least of which is corrected and will act as a long-focus lens with generally double the focal length of the combined lens.

I can anticipate the objection that will at once be advanced—its aperture will also be double, so that it will be relatively a very “slow” lens. But, despite this obvious disadvantage, the opportunities for the use of such a lens are very many more for moderately rapid exposures than will at first appear even if its widest aperture is $f/12.6$ or perhaps a little more. For, in the first place, you will not attempt the fastest shutter work with the long-focus lens; for if you can get so near as to render a very rapid exposure unavoidable, you will utilise the combined lens in the ordinary way. In the second place, it is not very commonly realised how the single component flatters its own aperture. The image with a “single lens” has always been described as brilliant, and although the single component of a modern anastigmat is not in any sense a single lens, it has fewer media for absorption, so that results at $f/12.6$ often seem as fully exposed in their shadow details as those with many a combined lens working at $f/8$. At any rate I have often given exposures of 1/400th sec., and obtained negatives which could not of course be regarded as perfect, but were at least good enough for reproduction in the press.

The single component of an ordinary "R.R." lens will act as a single lens of long focus, but, being uncorrected, it must be stopped down to such an extent as to preclude the possibility of much shutter work. It is highly desirable, therefore, to insist upon a single component being corrected to work satisfactorily at its full aperture.

I will now proceed to give examples of the obligatory use of the long-focus lens. The first occasion on which I fully realised its advantage was on attempting to photograph the Cambridge eight launching their light ship from the Goldie boathouse at Cambridge. I photographed from the opposite shore, and the picture was pretty enough, but the chief attraction, the boat and the men, was not demarcated sufficiently from the boathouse and other details. So the next day I took the identical view with the front half of my lens—15 inches focal length instead of 8—and obtained a result which the uninitiated could only conclude must have been taken from the middle of the river. Why not use the lens of short-focus and enlarge, may be asked? Of course, this can be done, and I believe that many professional pressmen trust to the inclusion of a considerable field by a short-focus lens working at a distance, and utilise their skill in enlarging any particular portion they desire to pick out. But I always think that enlargements are far from satisfactory, and four times magnification in this way is by no means the same as four times in the original negative.

In photographing a racing eight from a bridge, the use of a long-focus lens is in every case indicated, and is, moreover, encouraged by the special features associated with rowing, as I have described in the chapter upon that subject, so much so that even half an "R.R." lens may be employed for this purpose. I regard the picture of an eight from a bridge as

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so immeasurably superior if taken with a long-focus lens that I do not hesitate to include it under "obligatory."

A more convincing example of its use is at athletic sports when you are not permitted to photograph from a nearer point than the spectators' enclosure. Granted reasonably good light, very good work can be done from such a fixed position, and I have referred to this more in detail in the chapter on athletic sports; but I need scarcely say that you would not attempt this method except as a last resource when the subject is of such interest that you feel you must have a photograph of it.

A somewhat different example of an obligatory use is an occasion when from discretion you desire to be unobtrusive. Your permission to photograph may depend upon your keeping at a "reasonable distance," at which the short-focus lens would give too tiny a picture. Another variety of "discretion" is afforded by the photography of such an event as "throwing the hammer," when it is exceedingly dangerous to be at close quarters to the athlete. You cannot photograph the most rapid features by this means, because the higher speeds of your shutter are not possible with such a stop, but you cannot have everything; if you think the result obtained at close range is worth having, you must be prepared to take the risk of being killed.

The *optional* category of long-focus subjects will not occupy much time. Take once more our familiar example, the racing eight. It often occurs that an eight will pass so close to the bank that a short-focus lens would yield a sufficiently large image, but that, voluntarily, one permits the boat to pass further away in order to utilise a longer-focus lens. One does this to take advantage of the better perspective given, for when one remembers the distance

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A CRITICAL MOMENT IN A BIG JUMP: MR. E. E. LEADER, C.U.A.C.

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MR. S. S. ABRAHAMS, C.U.A.C.

which separates "bow" and "cox," the necessity of attempting to depict their proper sizes more accurately is justified. At Cambridge, where the river is very narrow, the eight would often "easy" close to the bank, and I could have used a short-focus lens to obtain as large an image as I desired, but I preferred to use the long-focus lens, focussing as the men prepared to start, and, by snapping at the first stroke, I could fill the whole width of my plate with the boat, and have perfect sharpness throughout by stopping down to $f/16$ or $f/18$. I had better mention, to avoid the least risk of misunderstanding, that this procedure is quite voluntary and entirely different from the *obligatory* use of a long-focus lens for an eight which passes very far from the banks on a wide river (*e.g.*, the Thames).

All other optional uses are again for the advantage of improved perspective. A photograph of mine of some runners, which had attained almost international celebrity, fell into the hands of an eminent pictorialist, who savagely criticised its "impossibility." Among other defects he demonstrated the relative sizes of the leading and last runners, for, although evidently separated by three or four yards at most, the latter was represented as only half the height of the former.

I am not reproducing this picture, but the same fault is evident in the photograph on page 17. There the disparity between the leading runners and "the tail" is enormous, and would make the whole effect ridiculous but for the sense of distance being suggested by the decreasing stature of the runners.

However, in view of the strictures of my critic, I set to work to try to make some pictures of runners artistically more correct by using the long-focus lens, handicapped, of

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course, by the impossibility of using a higher shutter speed than about 1-400th sec., even under the most favourable conditions. I did obtain some results which met with approval, but not in my eyes, for the slight depth of focus of the long-focus lens prevented that critical sharpness so essential in this type of work, and I have never found an opportunity to make further attempts particularly with the assistance of the swing-lens.

In general it will be found that the extension into the distance of your subject being exaggerated by the short-focus lens does not make for an "impossible appearance," exceptions being special objects of definite length, as the racing eight, in which the gradually diminishing size of the men does tend to become ridiculous.

For obvious reasons the reflex camera greatly facilitates the adaptation of the long-focus lens. Half the lens is quickly removed, the necessary racking out of the bellows is effected in a few seconds, and composition is at once satisfactorily settled. In other types of camera an additional extension has often to be fitted, sometimes in the form of an addition to the back of the camera, fitting in the position of the dark slide; in other cameras an extra bellows must be joined on, and often provision is made for the two focal lengths by marking the camera with two scales of distances, but this complexity is rather outside the capabilities of the ordinary amateur.

In my chapter on apparatus, even without bias I felt that I had established a very good case for the reflex, and the convenience of adapting the long-focus lens is another weighty point in its favour.

The long-focus lens is seen at its extreme in telephoto work. Since it is possible nowadays to obtain a telephoto

combination which, whilst giving an equivalent focal length of about thirty-two inches, possesses an aperture of $f/10$, it is evident that telephotography is now comfortably within the scope of shutter work. But in my experience occasions for this sort of work are very rare, although to the professional pressmen, who must obtain pictures in all circumstances, the high-aperture telephoto lens is gradually becoming a recognised item of his equipment. It must also be remembered that the telephoto principle obviates the troublesome long-extension bellows, the adaptation of which in many cameras is almost impossible. Thus in the telephoto lens referred to, a camera extension of only six inches is necessary.

I can quote one opportunity only of using the telephoto lens in my work, and that was during a Channel swim, when the brilliant light made such shutter work easily possible at $f/25$ (four times magnification). I have had no opportunity of experimenting with the extraordinary wide-aperture combinations now on the market. Their use would not be easy, but one can think of a few subjects—the Boat Race and cricket matches—when results could be produced which by no other means would have been possible.

CHAPTER VI.

THE USE OF THE SWING-LENS.

IN the chapter dealing with apparatus (Chapter II.) I referred to the necessity for a lens with what I termed "reasonable depth of focus"—sufficient, in short, to permit a little error in focussing or judgment of the instant to expose rather than the inclusion of many objects at different distances from the camera, sharply defined. As a general rule, the photography of moving objects is concerned with single figures or with a number of figures almost equidistant from the camera, so that want of considerable depth of focus is not a disadvantage; whilst in those subjects in which it is not desired that distant objects should be in focus their indefiniteness has the advantage in not detracting attention from those which are sharp and upon which the interest should be centred.

But it does occasionally happen that a subject is encountered in which considerable depth of focus is so desirable that it comes to be regarded as essential, and the object of this chapter is to deal with a method that may be adopted.

Depth of focus by stopping down the lens we can at once dismiss, for I am dealing only with moving objects which are obviously at close quarters (otherwise increased

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THE HURDLE-RACE. CAMBRIDGE UNIVERSITY 2. THE LONDON ATHLETIC CLUB.

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THE OBSTACLE RACE AT BEDFORD MODERN SCHOOL.

depth of focus would not be needed at all), and the shutter speed the nearer objects require quite precludes the use of a smaller stop than, say, $f/6.3$.

The rationale of focussing consists in decreasing the distance between lens and plate in order to bring distant objects into focus, and increasing it for near objects, so that it is clear that if you could swing away from the lens that part of the plate which corresponds to the foreground, and at the same time approximate to the lens that part which is exposed to rays of light from more distant objects, both near and distant objects might simultaneously be brought into focus.

Such a possibility is no new discovery; many workers with the usual tripod camera are frequently adopting it, for they may be seen utilising their swing-back to this end by increasing the distance between the lens and the top of the plate. But for the photography of moving objects the swing-back presents several objections. The first is that cameras with swing-backs are rarely employed for this branch of photography. Next, a back which swung away from a focal-plane shutter would certainly prevent the latter working efficiently unless we could swing back and shutter together—a possible adjustment, I believe, but one which would cause a terrible increase to the size of a reflex, the type of instrument for which this movement is particularly wanted. Finally, it is not a vertical swing which the focal-plane photographer usually requires, but a horizontal one, and unless the camera was of a type which was easily operated on its side, one would be no nearer the solution.

But if you cannot swing the back why not swing the lens, since it is only a question of utilising the varying distances between the lens and the different portions of the plate? I

hope I am not depriving any previous exponent of the credit for this idea when I state that the first to point out the uses of a swing-lens for high-speed photography was that very clever world-wide renowned photographer, Mr. H. G. Ponting, who suggested that it must be possible to adopt it horizontally as well as vertically.

The swing-lens is now a *fait accompli*, and more than one reflex camera provides for this adjustment. In some the swing is a single one only, in others the possibility of horizontal and vertical swing is present. A very simple and ingenious mechanism on the Minex reflex of Adams is one of which I have had considerable experience. Briefly described, the lens is mounted in a special panel with suitable bellows. By turning a screw the lens can be tilted backwards or forwards, the exact extent of its excursion being indicated by a lever which points to a mark when the lens is perfectly upright. The panel is rectangular, and, being removable and replaceable in any one of four positions, it is evident that a horizontal as well as a vertical swing of the lens can be produced.

Assuming, of course, that the lens is mounted as it should be mounted to rotate on an axis through its optical centre, it has no swing in the sense of a swing on a panoram camera. This is the first misconception to be destroyed, and the second is the exaggerated idea of the possibilities some attribute to it in apparently crediting the lens with intelligence, and blaming it because it fails to render in sharp focus objects all over the field whilst it is quite improperly used. Surely it is clear that if the camera is on the level with foreground and background directly behind one another, no amount of tilt in any direction can make them both sharp. But suppose camera, foreground, and

background have such a relation that lines joining them form a triangle, then the lens can be swung towards the distance, and sharp focus throughout the field is obtained. Similarly from an elevation the triangular disposition is again obtainable, and by swinging out the lens so that the top projects, universal sharpness is produced.

It is principally in its horizontal swing or tilt that this apparatus is useful. A familiar example is a string of runners, as in "A Big Field" (facing page 17), when it is convenient to photograph obliquely, including a bend in the track if possible. Focus on the position the leaders will reach, then swing the lens towards the most distant point in the field, and re-focus.

Take another example. In dealing with the photography of rowing I describe the advantages of a long-focus lens for photographing a racing eight and mention that, on account of the length of the boat, it is necessary to stop down the lens to have sharp focus from one end to the other. One nearly always photographs an eight more or less obliquely, and, as an alternative to stopping down, the essential depth of focus is at once obtainable by the use of the swing-lens. A third example is afforded by the "line-out" in Rugby football, as it is desirable to render the distant men as sharply as those nearest the camera.

Turning to its use vertically, I need scarcely point out that it is applicable on any occasion when the photographer can stand at an elevation either small or great. Not only are near and distant objects simultaneously focussed, but an additional advantage of increasing the depth of focus is particularly emphasised when photographing an object at an uncertain distance from the camera. I cannot give a better example than the photographing of a racing eight

from a bridge when very often it cannot be pre-determined where the boat will pass; the swing-lens will provide that whenever the exposure is made the eight will be sharply rendered so long as the nearest point below is in focus. The photograph of the eight which faces page 60 was taken in this way. The Cambridge eight was rowing a trial course, and when I reached Hammersmith the bridge was packed densely with spectators. I had to take up any position I could obtain and trust to luck, so I focussed upon the water below and swung my lens out at the top. I exposed as soon as I judged the eight was well in the field, and, despite this somewhat haphazard procedure, the boat lacks nothing in sharpness. In the same way, depth of focus being increased when the swing-lens is used horizontally, one's errors in timing can be to a certain extent glossed over; for whilst in the ordinary way an error of one yard may be a serious item, making all the difference between sharpness and diffusion, there is no such fear when the swing-lens has given a large increase in depth of focus.

If I, with my rigid minimum aperture of $f/6.3$, have found it useful, the $f/4$ men ought never to hesitate to include the swing-lens in their equipment.

I think it is evident from the foregoing that the ideal camera for its application is the reflex, and, as I said in my chapter on apparatus, I do not know if an attempt has been made to adapt it to any other form of hand camera. I see no objection to the adaptation, because, although it is of great advantage to be able to select the angle and graduate the swing of the lens whilst watching the effect produced all the time, yet with practice one learns to select the best angle and even to adjust the correct extent of lens swing before giving a glance at the focussing-screen; so

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ERNEST BARRY, THE ENGLISH CHAMPION.

To face page 53.



PRACTISING AT PUTNEY FOR THE BOAT-RACE: CAMBRIDGE BRINGING
IN THEIR BOAT.

that, provided it is possible either to focus upon the nearest object or to be able to estimate its distance from the camera very accurately, you can swing your lens in the same way as when a reflex is used. So far as I am aware, nobody has attempted to adapt the swing-lens apart from the reflex camera, so I hope that when amateurs realise its immense advantages and begin to demand it, the ingenuity of manufacturers will readily provide it.

Does the swing-lens distort? I suppose it must; it is scarcely feasible that some optical law is not set at defiance by so drastic an undertaking. But as yet I have failed to produce any example which suggested even the slightest distortion. What ought to happen is that the nearest figures should be rendered a little bigger, with a general decrease in size to the more distant figures, than would occur if the lens surface were parallel to the plate. But, inasmuch as a disparity between the size of near and distant objects is an inevitable consequence of the use of a lens of short focus, it would be difficult indeed, without the performance of very delicate and exacting tests, to decide if a little extra disparity had resulted.

CHAPTER VII.

THE SCIENCE OF "SNAPSHOTTING."

EVERYBODY realises that the reaction of an individual to a given stimulus is not—to use the term correctly for once—instantaneous. From a photographer's standpoint the problem can be readily summed up in a few words as follows:—a certain interval of time must be occupied by the complicated events which occur in the neuro-muscular system, comprising the seeing something, the passage of a message to the brain, its reception and appreciation there, and the translation down the nerves and muscles of the arm and forearm of a message which results in the orderly contractions which make the exposure. I say that everybody realises this, because we popularly describe persons as slow or sharp according to the rapidity of their responses to stimuli.

This interval of time is called *the reaction period* or *the latent period*, or more colloquially *the personal equation*, and it is measurable to a minute fraction of a second by means of an electrical apparatus for the details of which I can refer anyone interested in the subject to Halliburton's *Text-book of Physiology*. I think it is evident that part of the training of the high-speed photographer consists in shortening his latent period, but probably it can never be

reduced below 1-12th sec.—we are concerned, of course, only with visual stimuli—and my own I have had measured on several occasions and found to be 1-10th sec.

Most photographers will have successfully accomplished hundreds of "instantaneous" photographs without reflecting that on physiological grounds their most accurate timing ought to be 1-10th sec. late; unless, recognising the existence of their latent period, they voluntarily expose 1-10th sec. in advance.

That their timing is not 1-10th sec. late is evident from a glance at any successful photographer's work; 1-10th sec. becomes a very great period of time when one appreciates the accuracy which can result from pertinacious practice: the photography of an express train, for example, to an error of only 6 inches (corresponding to an error of 1-200th sec. by the brain); or of a golfball leaving the tee; or of the exact moment of impact of cricket bat or tennis racquet with the flying ball—degrees of accuracy not so easily calculated in fractions of time, but perhaps more convincing.

And yet the alternative explanation that one *voluntarily* exposes 1-10th sec. too early is alike inadmissible, for without exception all high-speed workers agree that their success depends upon waiting for the exact correlation before they press their release.

My explanation is a psychological one, or perhaps I should describe it as psycho-physiological. I suggest that, in dealing with the motion of an object the further course of which must—granting the absence of any sudden suspension of the laws of motion—be perfectly definite, through past experiences one anticipates this course and sees an event in advance of its actual occurrence: to reverse a time-worn proverb, believing is often seeing. This anti-

cipation neutralises the time lost by the existence of a human being's latent period, so that the exposure is actually made at the exact instant.

Although when I first advanced this explanation I encountered a certain amount of ridicule, there was on the whole a very welcome endorsement in scientific circles. When lecturing on the subject before The Royal Photographic Society I was very interested to hear, during the subsequent discussion, that at The Solar Physics Laboratory the psychological anticipation of vision is recognised and appropriate allowance is made in making astronomical records.

Now, it is clearly necessary to introduce another factor, the inertia or latent period of the shutter. In the case of an ordinary camera this is so slight as to be negligible; but the time which, in a reflex, is occupied by the passage of the mirror before the shutter descends would seem to be, and in fact has been stated to be, a serious deterrent to accurate working. It is nothing of the sort; the length of the latent period of your camera is of no consequence at all so long as your camera and yourself are co-ordinated. The whole art of training for "instantaneous" photography consists in the establishment of perfect sympathy between camera and operator until they become one with a regular latent period. That is an argument in favour of starting with a reflex rather than of "working up to one"; because, it is almost superfluous to point out, this delightfully harmonious working, the establishment of a *constant* latent period which is neutralised by the period of anticipation, is not acquired without a great deal of practice.

I feel that my descriptive powers are very feeble, but I suppose that just as the familiar touch of a favourite gun, cricket bat, or lawn-tennis racquet has that wonderful

psychological influence which makes all the difference to its possessor when contrasted with a strange instrument; so with every inch of your camera, its knobs, its weight, its size play their part in exercising control, in determining just the correct tension of appropriate muscles, in providing precisely the exact stimulus to the nervous system—all of which complexity we sum up in the simple term "training"!

It becomes clear from the preceding why on some days we time more accurately than on other days: a little extra excitement, your anticipatory factor becomes increased, your latent period perhaps also slightly shortened, and you expose too soon; on the other hand, a little physical disturbance, you are sluggish, your reaction period is lengthened, and you are late every time. I am very fond of quoting one little incident by way of example. In an inter-Collegiate hundred yards race at Oxford, my brother was leading, and although I pressed my release (as I thought) to show the breaking of the worsted, and although I could have registered the most solemn affidavit that I *saw* the worsted broken before I did expose, yet development showed the worsted intact with my brother perhaps a foot behind it. In this case fraternal affection and desire for his victory had increased my anticipatory factor beyond its normal length! A cynical friend has suggested that by way of variation I ought to take a photograph when the leading runner and probable winner was one whom I desired not to win!

It is interesting to speculate upon the photography of a subject (the like of which, however, I cannot imagine) the further course of which could not be known, and about which therefore the mind could not be prepossessed. We should then be dealing with the latent period for *unexpected*

stimuli, which in itself is always longer, and there could be no anticipation, so we should probably be hopelessly late in making the exposure.

Although I venture to think the inclusion of this chapter legitimate for its scientific interest, my purpose has been for it to point a moral—*watch your subject directly* in order that you may expose at the correct instant. Never use a finder, save of the direct vision type, nor the ground glass of a reflex. Train yourself to expose when you *think* your subject is exactly where you want it, and in time you will surprise yourself with your own, almost uncanny, accuracy.

I cannot do better than quote the words of Mr. F. J. Mortimer, the editor of the *Amateur Photographer and Photographic News*, in his masterly editorial note on my first article upon this subject. "The normal individual will do well to follow his natural instinct and, after having become master of the mechanical processes of his camera and shutter, expose at the exact instant he thinks the subject has assumed its correct correlation."

If you do not work on this principle you will have no system at all, and you will never be able to regard yourself as a reliable photographer, but only as a man who occasionally makes a lucky fluke.

CHAPTER VIII.

THE PHOTOGRAPHY OF RAILWAY TRAINS

IN the infancy of "instantaneous" photography the express train was a very popular subject. That was in the days when the unsophisticated public had not yet become accustomed to many examples of suspended motion, when the cinematograph had not come into existence, and when the photographic representation of any moving object as if stationary was regarded as a very great feat. Furthermore, the opportunities for photographing other rapidly moving objects were not at that time appreciated. Nowadays one scarcely ever sees a photograph of a train in motion save as an advertisement for a railway company. But I have selected this subject as the very first which a photographer of moving objects should attempt, not only in spite of, but actually on account of, its rapidity. The difficulty of photographing moving objects increases with the impossibility of exactly determining the course they will take. This difficulty is clearly at a minimum in the case of a railway train, and the greatest facility is afforded to the novice to ensure accuracy of focussing at his early efforts. An additional reason I have for selecting an express train as an elementary subject is that so excellent an opportunity is afforded for training of eye and hand. There is a fixed

point at which to expose, subsequent development will show how accurate the attempt has been, and it is feasible that the same train could be utilised day after day until perfect timing is achieved. And, as a final reason, it is highly essential that the photographer should educate his "nerve." "What rot!" I can imagine someone interrupting. Well, wait until it is your fortune to have to photograph your brother in an important athletic event, and you will see if you haven't a bigger "needle" than he, with your hands shaking and your camera wobbling; then you will understand what I mean by cultivating "nerve." There is something terrible in a rapidly moving object rushing down upon you, and often passing very close to you. You will have to stand within two yards of a railway line, and by the time you have acquired indifference to an express train at such close range there will not be much the matter with your "nerve."

Into the details of the preliminaries you must adopt to secure a good position I need not enter. In some cases a little trouble to obtain permission from a company to trespass upon their property may be necessary, for I advise a position very near indeed to the line; in some cases, of course, you will be compelled to take up a position comparatively distant. Your ambition should be to obtain as large an image as the limits of the plate will permit. I do not remember how close the engine was to me when I photographed the train which is illustrated facing page 20; I believe about eight yards. The result may be horribly ugly and in contravention of every law of good taste, but that has no concern with my purpose, which is not the production of artistic photographs.

The angle at which you stand to the line of direction of

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THE 1908 CAMBRIDGE EIGHT ROWING A TRIAL COURSE.

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BRINGING OUT THE EIGHT FROM THE GOLDIE BOAT-HOUSE, CAMBRIDGE.
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the train is one which is kind to the shutter ; but if the latter is badly constructed, distortion may occur. This is an additional advantage in favour of experimenting with a very rapid object if a new camera is to be tested. The speed of the shutter is thus roughly standardised in the best way possible.

The possessor of a lens shutter, whilst debarred from attempting work at very close quarters, may yet find in the photography of a train an excellent exercise. The image is naturally much smaller, and since the surroundings can be utilised, and may indeed with advantage be selected, the pictorialists may thus find a field for their aspirations.

The focal-plane worker should, if prevented from working at close range, obtain as much exercise as possible for the shutter and himself by photographing at right angles.

In all cases the negative is closely scrutinised to see how near the front of the engine is to the marked sleeper or post upon which one focussed. By the time you can hit off an express train travelling seventy miles an hour correctly to nine inches or a foot in four out of every six attempts, you need have no fear regarding your accuracy in "timing"; and if after some absence from shutter work you are short of practice, the easily utilised locomotive is as good a means as any of getting back into condition.

ANALOGOUS SUBJECTS.

One will obviously include under this category all rapidly moving objects whose direction is in a definite straight line or nearly so. It is unnecessary to deal at any length with the rest of these subjects, but a few require a few words of special description.

Motor cars are particularly interesting to us as constituting

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apparently the subject *par excellence* for demonstrating the iniquities of the focal-plane shutter. In fact, one sees so many distorted pictures of fast cars that the conclusion seems almost unavoidable that there is something in their movement if not in their speed that baffles the shutter.

I have not done a very great deal of work upon very rapid cars, and, although it must be conceded that the conditions are often exacting, inasmuch as a position almost at right angles is generally attempted, yet I cannot help thinking that the majority of such pictures have been produced either with shutters which were wilfully set slow or whose mechanism was faulty with insufficient spring tension throughout the exposure. These conclusions are endorsed by some investigations. A Panhard at 80 miles an hour was found to have moved no less than 4 feet during an exposure, and, calculated from the size of the car on the plate, it meant that the whole plate had received an exposure of 1-15th sec. and the car an exposure of 1-30th sec. only. Of course, a focal-plane shutter with narrow slit and low tension had been used; the narrow slit prevented blurring, but the low tension accounted for the distortion. With such ridiculously improper usage of the focal-plane shutter how could one expect to produce a true result?

Steamers differ from railway trains in the difficulty of approaching sufficiently near and in pre-determining a point of focus. Against these difficulties may be set off the slower velocity of the steamer and its environment—most actinic surroundings—so that a long-focus lens with a comparatively small stop may be adopted. If you will carry into practice the principles underlying the photography of trains, nothing that I can add will be of service.

The same details apply to *motor-boat racing*, with the

additional difficulty that the subject is a much smaller one. I have never taken one on the sea, but only on rivers from an anchored boat. I find the best position is that which takes the boat just going away from one, as an excellent impression of motion and speed is conveyed by the wash and the general appearance of the boat.

If you have undergone a fair apprenticeship upon trains and thoroughly learned the capabilities of your shutter, you will have no trouble in calculating the exposures necessary for any of the moving objects I have considered. All that determines the rapidity of exposure is motion in a straight line, which involves the simplest sum in proportion.

CHAPTER IX.

THE PHOTOGRAPHY OF ATHLETICS.

THE subjects which are comprised under "athletic sports" are on the whole the most attractive which come into the category of moving objects. I intend to treat them rather fully, more especially as a number of points which are of general interest may be emphasised and their repetition avoided.

As "athletics," we have to deal with the following events: short-distance races (particularly the hundred yards), quarter-mile, half-mile, mile, three miles, and longer distances, 120 yards hurdles (rarely longer distance hurdle races), high, long, and pole jumping, putting the weight, throwing the hammer, steeplechase, and obstacle races. Of course, no one meeting includes the whole of these events: the Amateur Athletic Championships meeting exhibits all but obstacle races; the Universities' and Inter-University meetings have each ten events; and other athletic meetings vary, but are on the whole stereotyped, presenting handicap rather than scratch races. School sports, on account of the great variety of incidents, offer most excellent opportunities to the photographer.

To obtain permission to enter the enclosure and walk about more or less unchallenged is the first work of the

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THE 1905 CAMBRIDGE EIGHT ON THE CAM : GOING ROUND "GRASSY."

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A LINE-OUT.

photographer, who must, however, be prepared for a polite refusal to the effect that, whilst there is no objection to *him* personally, a decision in his favour would result in a clamouring swarm of "snapshotters" (satirical generalisation for men armed with hand cameras), who would jeopardise the comfort of competitors, judges, and spectators. It is bad enough to impede the view of a spectator, but it is absolutely unpardonable to subject a competitor to inconvenience. My "practical hints" will deal principally with the various ways in which a photographer may transgress so that no reader should ever bring discredit upon his confrères!

You may take it for granted that the difficulty of obtaining this permission varies directly with the importance of the meeting, and therefore incidentally with your desire. To prevent disappointment, I may as well inform readers that at the two most important athletic meetings in England such permission is rigidly withheld. At the Amateur Athletic Championships definite arrangements are made with certain professional press photographers; at the Inter-'Varsity Sports at Queen's Club not even the professional press may enter the enclosure. At the Oxford University and Cambridge University Sports permission is officially refused, but considerable freedom is allowed the careful photographer: at all other sports a sensible letter to the secretary will usually be sufficient. But, as I shall point out, even if condemned to the position of an ordinary spectator, the photographer can still do excellent work.

Armed with the official sanction, there need be no hurry to arrive on the ground; but if you are to play the rôle of spectator-photographer, you must arrive not merely early,

but very early to be in advance of the crowd, and also carefully to examine the track and decide upon that position which will permit as much work as possible. At Queen's Club, for example, the position which faces the finish of the hundred yards will also yield photographic possibilities for the finish of all the other races except the quarter-mile, for the start of the one and three miles, for stages of the quarter, half, one and three miles, for the high jump, and even for putting the weight ; or, in other words, there is ample scope for a camera. Working at the Amateur Championships at Stamford Bridge, I came to the conclusion that two photographers who had carefully selected their positions in the spectators' enclosure could, if they agreed to pool their results, actually cover reasonably well every event on the programme.

The *hundred yards* may be photographed at the start, at the finish, or at any point of the race. You cannot take more than one of these positions—a warning which is not a reflection upon your intelligence, for I have actually been requested to perform such a feat by three independent individuals. You will not photograph the middle of this race unless you are reduced to this position among the spectators, as I was at the Amateur Championships last year. But this gives me an opportunity to show how the photographer may derive quite an advantage out of an apparent disadvantage, for the example which faces page 33 is rather exceptional and would not have been thought of had I been free to take the start or the finish.

I have for some time advocated taking the start, although the finish is still the more popular picture. You select a scratch race and stand as nearly facing the runners as you can. Even from the spectators' enclosure this is still feasible, but you should take care not to get too near, for at the last

moment a programme or an elbow may block your lens ; by standing further back you can lean out clear of the crowd.

The interest of a start of a sprint depends upon the crouching position which the men adopt. As they "set," you must snap if your shutter is only a lens one, because, although I have seen it stated that movement is slow until after the first stride, this is not the case, for the initial movements—particularly of the arms—in overcoming inertia are very rapid indeed. If your shutter is a focal-plane, it would be set not at the maximum speed, but pretty near it, and you hold on tight until "the bang." Watch the starter, not the runners, for occasionally one breaks away trying to "beat the pistol," and if you are deceived your chance is gone for ever. If the starter is an experienced one like Mr. Lockton or Jack Wilkinson, the start will be a fair one 49 times out of 50, so wait for the pistol flash and see in the negative if you get as good a start as the athletes. I always ask the starter to stand behind the runners, so that he is included to add realism, and this is a position almost universally adopted by experienced pistol holders. It is interesting to see from the photograph of the start reproduced (facing page 19), that of the four runners only the one on the extreme left started fairly at the report. Two of the competitors, excitable foreigners, repeatedly "broke away," and a fair start was impossible.

We will now consider the finish of the hundred. It has this advantage over the start that any handicap race will do, whilst for the latter photograph a scratch event is essential. If you are on the field, you will desire to take a perfectly straight view, and the plan is as follows: go to one of the middle upright stakes which support the strings separating the runners and walk straight back until your plate covers

the entire field. And be sure that it does cover the entire field; if you are tempted, in order to secure large figures, to cut out one of the extreme edges, the man running there will surely repay your ill-treatment by coming in first and spoiling the photograph. Stoop down if there are spectators behind you, otherwise stand up. It is true that you appear to be right in the path of the runners, but the position is a perfectly safe one. As the men finish they have plenty of room to run right and left past you, and I have often seen a huge field camera planked down in such a position without any mishap. Exposure at close quarters—1-600th sec.

If you are photographing the finish from the spectators' enclosure, you must be not in front but to one side, to avoid other photographers who may have the luck to be in front of you. Then the chances are that you will be so far from the finish that a long-focus lens is essential. I have used one only at Queen's Club when at a distance of perhaps 25 yards from the finish, and even so far away a fairly rapid shutter is necessary. On the whole, the lens-shutter man had better leave the finish of the hundred yards alone unless he is content with ridiculously small figures and the race is of very great interest, which, of course, is the case with the Inter-'Varsity event.

Other sprint races agree photographically with all I have written regarding the hundred yards.

Mention of the finish of sprint races reminds me that photography has more than once been invoked to judge the result of a race, and in fact I myself have been asked to undertake such a test. If the same task is offered one of my readers, I advise him to refuse without hesitation. For, granted such a degree of infallibility that one could guarantee to expose every time exactly as the



"CONVERTING A TRY."

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"A CLEVER SWERVE!"

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"BALL'S AWAY!"

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winner broke the worsted, the result cannot possibly be judged from the front, and even if a runner's feet are clearly leading, nobody can tell in the photograph if his chest is also in advance. Often and often one sees in photographs misleading items of this kind on account of the angle at which they were taken, and possibly of errors of perspective also, due to the use of a lens of too short a focus. But it has also occurred to me that the judges may have been in the wrong when a photograph suggests something very different from their decision—for example, by how much a man has won. At last year's Amateur Championships I photographed the hundred yards as I have already described at the half-distance, with the men at right angles to the camera. It appeared to me as the men flashed past that Mr. R. E. Walker, who eventually won, was leading. Next morning, in describing the race, many papers stated that at half-way Mr. Walker was not in front; some said Mr. Kerr, the Canadian, led, others, Mr. Cartmell, the American; but I believe that most agreed that Mr. Walker was second. When I developed, there could be no doubt from my negative that Mr. Walker led from Mr. Kerr by a clear half-yard, and I think this tends to show that the focal-plane man becomes on the whole very accurate in his determination of situations. (The picture reproduced, facing page 33, is the heat of the hundred yards in which, of course, Mr. Walker had a very easy victory, not the final to which I refer.) It is remarkable that of all the sprint races I have photographed, one only was adjudged a dead heat, and that from my photograph hardly anyone would hesitate to dispute this decision, one runner appearing well in front of the others. It was therefore of the greatest interest to me when, on showing this picture among others

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to Mr. L. F. Tremeer, the well-known L.A.C. runner, he said without a question, "That's a dead heat." It transpired then that Mr. Tremeer, who combines the acumen of a trained observer with the experience of an athlete, decided not by the position of the men, but by the expression on their faces. "Each of those two men thinks he's won," said Mr. Tremeer. Now, it is certainly remarkable how closely you can estimate if a man whom you are fighting close at your shoulder is in front of you or not, and presumably as you "catch the tape" or not, your expression will evidence the elation or disappointment you involuntarily feel. As each man thought he had won, the odds were that both had won. But I do not venture to offer the expressions on the face of an athlete in action as a valuable means of ascertaining his emotions, and we should require a very skilled jury of physiognomists to act as judges at a race meeting if this plan were adopted!

Turning now to the other flat events. The quarter-mile race deserves special mention in that on a circular track (four to the mile) one may photograph both the start and the finish actually without change of position, and even on a three-to-the-mile track, the photographer ought to be able to snap the start and trot 150 yards within the fifty seconds or so that are at his disposal. But there is little advantage in taking the finish, and this applies to all longer distance races, unless either you have reason to expect a very close finish, or the race is a classic one in which record may be broken. It is remarkable, however, how people hanker after the finish of any race.

The *quarter-mile*—I am referring to scratch races—is best taken at the first corner, especially if this is near the start, as at Stamford Bridge, and on circular tracks generally. At

this stage the men fight for the corner and "compose" well. Stand on the outside of the track to obtain the best position. The illustration which faces page 18 shows the idea very well. Exposure at close quarters—1-600th sec.

The *half-mile* should be photographed early in the race, say within a hundred yards of the start, as men who are out to make the pace often get too far ahead later in the race for good "composition" to be possible. In a handicap race the best massing of men will be found as a rule about 250 yards from the finish. In a mile and longer distance scratch races, you can take the start as a press picture if it is an important event, but the absence of the crouching position robs the picture of photographic interest. The men always "compose" well as they finish the first lap, and that is the position at which I always take them. You may stand either on the inside or the outside of the track, taking an oblique position to depict the Indian file, which is at this stage of the race the customary arrangement. In handicap races almost any point of the race shows good grouping of the men.

It is a good plan to put a piece of paper—a very small piece is necessary to avoid obtrusiveness in the picture—on the inside of the track by which to focus, and to expose when the leading runner, who is sure to be on the inside, reaches it. A piece of wood or other substance stuck upright in the ground is even better, and, in fact, I make a point of carrying in my pocket a small metal rod, which can be put down whenever required, and is admirably adapted to fix the eye.

If one is forced to remain among the spectators, long-distance flat races can best be photographed at a corner. The position at Queen's Club I have mentioned affords such an opportunity.

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Recently *relay races* have become very popular events at most meetings. You should aim at exposing at the first relay exactly as the second runner is sent off. Stand well to the side to avoid the incoming runner as he leaps to the inside or outside of the track.

In the *hurdle race* it is best to photograph as the men top the first flight; the chances are that at this stage all the runners will be together, and that they will be together at no other part of the race. The only other position from which you might photograph is from behind "the tape," facing the entire flight, and taking the leader at the last hurdle. Messrs. Stearne of Cambridge have a unique picture of the Inter-'Varsity hurdle race of about fifteen years ago taken from such a position, showing all four hurdlers clearing the last flight simultaneously. But such a race occurs remarkably rarely, and the only occasions on which you should take up such a position are those which are of classic interest, and when permission to get nearer is refused. I have photographed once only from behind the tape, and that was at the Inter-'Varsity Sports of 1907, when Mr. Kenneth Powell was expected to beat record—a feat which he actually achieved—and I meant to have a souvenir. But the figures taken at such a distance away are absurdly small, even if a long-focus lens is used.

For the same reason the lens-shutter man will have a poor time with the hurdle race, for he will have to stand so far away that, unless he has the luck to arrange a remarkably clear background, one will hardly be able to see from his photograph what he was endeavouring to depict.

I will assume now that you are going to photograph, as I have advised, at the first flight. The instructions which follow may seem rather obvious or unnecessary; but it is

just these trifles, usually unconsidered, which make all the difference between a first and a second-class success, and will prevent you causing anyone the slightest inconvenience. As you walk to the hurdle, ask every competitor if he has any objection to your photographing. Hurdling is the most "nervy" thing an athlete can do, and adventitious and unnecessary interference will consequently be resented. In nearly every case an easy refusal is given: "No, not at all"; or, "Shan't hear nor see you," is the usual reply of the crack hurdler, who has nerves of steel—he would not be a crack hurdler if he had not. But a man may object, so it is as well to find out.

Stand at the second flight of hurdles, and one or two yards from one of the side hurdles. Take that side which is opposite the one selected by the starter, so that your body does not obscure his pistol smoke from the time-keeper at the finish. There is no necessity to kneel down, for you will not block any spectator's view, and there is every necessity not to do so, for, although I have seen it advised to silhouette the hurdlers against the sky, if you kneel down to do so, a distorted perspective must result, whilst the advantage of your "silhouette" is largely neutralised by the light colours of the hurdlers' limbs and garments being badly defined against the blue of the sky.

The position I have mentioned brings you about twelve yards from the hurdlers at the correct moment of exposure, and this is just right for maximum size of figures with four hurdlers in a race—the usual number. You can aim at a more oblique view by standing further away from the side, but as straight a view as possible is much the best. Exposure—1-600th sec.

From the hurdle race to *the high jump* is an easy transition.

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It is of great advantage to take the athlete in practice, but if you are compelled to photograph him in actual competition the greatest care must be exercised to avoid interfering with his comfort. Like their hurdling brothers, the best high jumpers are men of nerve ; but the poorer performers are very different in their attitude towards a photographer, and should they fail at a jump they may more or less justly blame the camera-man for his proximity. In any case avoid being exactly in the jumper's line of vision : he likes to see the bar clearly and only a blurred suggestion of all beyond it, and he may find it distracting to "jump in your eye," as he puts it.

Then study the jumper to distinguish any peculiarity which should be portrayed. The orthodox straight or side jumper is best taken as nearly as possible in front or from that side which will show his face. Some men show up well from behind, particularly the experts who have a tremendous flip in mid-air ("American style"), examples of which were Mr. Howard Smith and Mr. A. C. B. Bellerby, the present Cambridge president of athletics. I used to find a high jumper of the graceful type best taken rather late—when falling, in fact.

At Queen's Club and Stamford Bridge, when you must work from the spectator's enclosure, you must use a long-focus lens. At the former you are almost compelled to take the jumper from the back ; but as some men—for example, Mr. Bellerby—photograph just as well from the back as from the front, whilst others turn completely round in mid-air, this position is just as good as from the front.

As high jumping involves some exceedingly rapid limb movements, the shutter must be driven quite at its fastest, and, as I find 1-400th sec. about the maximum speed

consistent with reasonably full exposure with the comparatively small aperture of a long-focus lens (*vide* Chapter V.), perfectly sharp definition with the latter is an impossibility. Lens shutters cannot attempt this work in any circumstances.

If a jumper has in competition failed twice to clear a height it is positively cruel to photograph his last attempt. The noise of your shutter, not to mention the disturbing influence of your proximity, may quite put him off in his very highly strung condition. All you lose is a photograph; failure may be of very great moment to him.

Pole jumping needs scarcely any mention. In the first place, it is rarely seen in this country; even for the Amateur Athletic Championship only one competitor appeared last year. The details of its photography are exactly parallel with those of high jumping; but it is much easier on the whole as a photographic event, as the stages of the jump are slower and the optimum position—man and pole falling—can be picked out.

Turning now to *long jumping*. This is a comparatively easy event to photograph, and again it is best taken in practice. The position is optional, but should be from the front if a crowd is round the jump. You can obtain a very large or merely a small image according to your inclination, to the freedom of your position, or to the capabilities of your shutter.

The jump depicted facing page 45 is about the largest size possible. That facing page 36 is a more pleasing rendering of the entire field of action. Even the lens shutter can cheerfully enter this competition, for I have often obtained some very nice little pictures at 1-80th sec. In long jumping the athlete bunches himself up, and the wild limb

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movements which determine the rapid exposure for a high-jump are absent.

I have two warnings regarding photographing this event in competition. Once you have selected your position, stop there. I have seen a foolish photographer walk across in front of the pit whilst the jumper was running to the take-off. This is calculated to upset the jumper hopelessly. The other warning is regarding focus. There is a temptation to focus upon the piece of paper which is put down in the pit to encourage the jumper to extend himself and clear it. But one's exposure is almost instinctively made when the jumper is at his maximum height in the air, and this, in the case of a good jumper, is at about 16 feet from the take-off, whilst the paper is usually put down at 21 or 22 feet from that point.

A final warning refers to the photography of long jumping in practice as well as in competition. Do not kneel down, for if you do you will exaggerate the height which the jumper attains in the air. When one remembers that a crack jumper at the top of his jump is well over 5 feet up (*vide* photograph facing page 36), it is evident that an attempt to exaggerate this is quite unnecessary. Similarly, high jumpers should be photographed at or about eye level; by taking a sort of worm's-eye view you can make a modest four feet jump look quite six feet. I have included the photograph of a high-jumper, which faces page 37, to show how deceitful is the result very often when taken from a low level. The jumper is clearing little more than 4 feet; but his performance seems to be every bit as good as that of the athlete facing page 44, who is nearly over a trifle less than 6 feet. Closer observation shows the distortion in the former photograph.

To face page 76.



"PASSING AMONG THE 'THREES.'"

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BOWLING AT THE NETS ON FENNER'S, CAMBRIDGE.

To face page 77.



"A CRISP CUT FOR FOUR."

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AT THE NETS, FENNER'S, CAMBRIDGE.

The *steeplechase* owes its photographic interest to the water-jump, so one has to apply the principles of the long jump. Photograph the first time the men reach this obstacle, as they soon straggle out, and aim at showing several men in the picture. No attempt is made, as a rule, to clear the water, but experienced men save themselves by jumping into it; you may therefore be able to show three or more stages—one man wading out, another splashing into the water, a third in mid-air, and so on.

The next events, *Putting the weight* and *Throwing the hammer*, are seen at few athletic meetings other than the Championships and at the Universities. The weight (or shot), I may remind readers, is a ball of lead weighing 16 lbs., and it is projected from a square to a distance of anything up to 50 feet. It is easy enough to photograph mediocre performers, but a first-class man puts with such force that this ball, heavy as it is, attains an almost incredible height and velocity. Do not stand very near when you are photographing a first-class man—about 10 yards is quite near enough—or you will very likely lose the weight altogether in your picture. As the athlete poses in the square, making his preliminary efforts before putting, the shutter can be driven much more slowly; but to obtain a photograph showing the weight just leaving the hand, and perfectly sharp, is one of the most difficult things to attempt in focal-plane photography. The lens-shutter man can photograph from behind; the weight, though small, will be sharply defined, as the velocity soon dies down and the moving object in question is travelling away from the camera.

Throwing the discus is an event seen only in the Olympic Games, and very few readers will ever have a chance to

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photograph it. The exposure should be made whilst the discus is still in the athlete's hand, as there is an orthodox pose which is a charming feature to illustrate.

Throwing the hammer.—The "hammer" is a ball of lead attached by wire to a handle, the whole weighing 16 lbs. (This for the benefit of any reader who has not seen the event.) The thrower stands in a circle, grasps his handle, and whirls round and round: when he has gained sufficient momentum, he throws the hammer, which proceeds to a distance, which may be anything up to 175 feet; 100 feet is a good average throw.

It used to be the fashion for would-be reformers to agitate year after year for its abolition from athletic meetings, and nobody could have supported their petition more fervently than I; for whenever there was a hammer-thrower about I invariably felt a mad fascination to go to photograph him. It is a risky business. With a poor thrower anything may happen: the hammer may go five feet, and the thrower fifteen; or the hammer may be released involuntarily and proceed in a direction quite unpremeditated by the athlete; whilst, finally, even with a crack performer, the "head" may come off. Thus, even with a first-class thrower, there is always some risk, and with an indifferent thrower one is really not safe within 100 feet of his circle. I have had two narrow escapes myself, and now that my nerve has been shattered I never approach very near, but use a long-focus lens. In my earlier days I would stand within 7 yards of the circle. You may photograph as the thrower, standing in the ring, swings the hammer round his head—1-250th sec. suffices for this. Next, he revolves rapidly in the circle, and the shutter must be faster. If very daring, you may aim at a *chef d'œuvre* in the shape of a photograph

which shows the hammer just leaving the hand, and this requires a shutter absolutely at top speed. Finally, if you are working at a distance, you can expose when the hammer is in mid-air, whilst the characteristic pose of the man maintaining his position in the ring is still evident.

The Scottish strong-man event, *Tossing the caber*, I have never seen. I take it to be a sort of cross between putting the weight and throwing the hammer, and its photography appears to be easier than either.

In *obstacle races*, which are most often seen at school sports, it is scarcely possible to give any direct hints, since so many varied episodes may be included, the photography of which in their most characteristic incidence suggests itself. "Getting through barrels" and "the sack race" are two very pleasing episodes; the former should be photographed as nearly as possible from the front; the latter is usually most convincing when the boys have to "jump" a small obstacle. I would offer one piece of advice regarding obstacle races in general—do not attempt to include a great number of figures, particularly in such episodes as "climbing ropes" or "picking up potatoes" in order to show the competitors at different stages, for one tends thus to accumulate a large number of small figures which bewilder the eye: concentration upon fewer and larger figures is far preferable.

One other event, the *tug-of-war*, is occasionally introduced into athletic sports. It will require only a slow speed of shutter (1-80th sec.), and the only trouble I have encountered is obtaining a position which will include sufficient figures. I rest satisfied as a rule with restricting my field to one only of the competing teams.

I cannot conclude the consideration of athletic sports

without a reference to the benefit to athletes of photographs which illustrate the critical points of their performances. It will add enormously to the pleasure of your photography to hear the enthusiastic appreciation of the men who "did not realise *that* before" or who "never dreamt that they did so and so like that."

Photographs will not only show faults which must be corrected, but, if good performers have been selected, good points may be evidenced for beginners to emulate. In America photography is largely used for both these purposes, and at some of the universities a large cinematograph is often employed. In the face of the extraordinary business an American athlete makes of his training, it would be protesting too much to attribute to photography his undoubted superiority to ourselves in certain events; but even within my own experience more than one high jumper has unquestionably improved to a very marked degree as the result of a series of photographs I have given him. Almost every event in athletics lends itself in this way to photography. A photograph of a start for the hundred shows remarkably clearly what one may be doing wrongly and how to alter it. In sprinting the importance of the position of the head and arms is brought to light, particularly if a position at right angles like the photograph facing page 33 is adopted.

Photographs of hurdling are particularly useful, and in the example included on page 48 one notes that whilst all four men are good performers, each one shows an undoubted individuality of style.

In jumping, and particularly high jumping, my camera has been in great demand. One sees such remarkable things in a photograph! Last year, when Mr. Bellerby

To face page 80.



MR. KENNETH POWELL.



MR. A. G. BARRY: "THE BARRY SWING."

To face page 81.



MR. H. L. DOHERTY, EX-CHAMPION OF THE WORLD.



"BUNKERED: WELL OUT!"

had altered his style, I could not believe that the press photographs of him were not distorted; they showed him with his feet about nine inches higher than his head. At the earliest opportunity I took some for myself, being scrupulously exact regarding the level from which I photographed. One of my results appears on page 36, and I no longer doubt that on account of his tremendous wriggle in the air, Mr. Bellerby's feet do rise markedly above his head, even if not so much as nine inches. It is partly for their value as certificates of fact that I deprecated the photographs of jumping from a low position.

It is difficult to obtain just that position in throwing the hammer which is of most value to the thrower, viz., the moment the hammer is released. Anxiety for one's own safety usually prevents success. I doubt if weight-putters can learn much from any particular position which a photograph may show, but I have always found my results in great demand.

In general, there is a fine field for research for any photographer who has leisure and liking for this work of analysis. He will find unlimited interest in the attempt to illustrate the exact details which the athlete requires; he will have open-air recreation; and he will enjoy the society of some of the nicest fellows it is possible to meet.

WALKING.

Walking photographs are hardly worth consideration. Inasmuch as the regulations demand that in "walking" both feet must never be off the ground simultaneously, it is impossible to illustrate anything at all striking. It is only in the big walks that the attempt is worth

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making, and then mainly on account of the classic interest which attaches to a famous event in the world of sport. Pressmen aim at showing interesting occurrences during the walk, consideration of which is outside my province.

There is always a good deal of bad feeling occasioned by walkers who have been pulled off the track for "lifting," and I daresay if more photographs were taken of walking races many positions, at least suspicious, would be obtained. I remember in this connection an attempt being made by a famous athlete to lower a long-distance running record on grass. A number of photographs were taken and published quite innocently, but they showed the runner well inside the chalk-line and flags at various times during his run and absolutely killed any chance of his record being passed.

CROSS-COUNTRY RUNNING.

This is in a category by itself. It is not a very attractive event for the photographer, since it is almost inextricably associated in his mind with dull, cold weather and long journeys on foot through fields of mud. In certain cases it is possible, if you can previously study the course, to take short cuts and meet the runners as they cross the road at intervals. On the Gog-Magog course at Cambridge I have been able to take the start of a run and then, by brisk (very brisk) cycling, photograph at three or four stages of the run. It is hard work and scarcely worth attempting. The most pleasing picture I have ever obtained was that of runners coming down a lane which was powdered lightly with a recent fall of snow. But thick mud is much the more familiar concomitant, and its photographic beauties I have yet to learn.

CYCLING.

Cycle races comprise much the same photographic features as running. The start is purely a pose and useful only for press purposes, and the lens shutter is as effective as any other. The finish is taken as the leader crosses the line, and it is best to take as straight a view as possible, not so much relatively to decrease velocity as to include the men behind the leader.

On the whole the only part of a race worth taking is the last lap on a banked-up track when the men really do appear to be racing. There is usually no difficulty in selecting some marked point at which to expose, and on such an occasion I think it justifiable to hold the camera rather low down to give a better representation of the high bank, as some of the riders may be well up towards the top. Cycle-racing is not a popular subject with the photographer, and the only pictures seen in the press are of those events in which the grotesque or the unusual is introduced.

ANALOGOUS SUBJECTS.

Any subjects in which walking enters will need no comments in addition to those already made.

Gymnastics (when taking place in the open) come under the same consideration as obstacle races with special jumping features which are usually sufficiently obvious.

CHAPTER X.

THE PHOTOGRAPHY OF ROWING.

THE desire to identify oneself with a sport in which, *pace* the pessimistic demonstrators of our decadence, we are still pre-eminent is probably the chief reason why the photography of rowing is so eagerly attempted. So keen in fact are those photographers, who may not live near a river where racing occurs, that it is no unusual thing for them to make a special day trip to Oxford, Cambridge, or Putney, entirely in the interests of photography.

In this chapter I shall confine myself to the consideration of racing craft. Racing takes place in eights, fours, pairs, and in single sculling-boats: the double and triple scullers are comparatively rarely seen, and their photography involves no special feature.

In the first place, one may premise that actual racing can comparatively rarely be photographed. The requirements for a successful picture of a race are, first, a river of exactly right width: if it is too wide, as on the University course from Putney to Mortlake, the boats are generally too far apart for both to appear on the plate with convenient size; if too narrow, as at Oxford or Cambridge, ordinary racing (boats side by side) cannot take place at all. Secondly, one must be fortunate enough to select a point at which the

boats are level or very nearly so, or the difficulty of representing both is again very great. I do not mean to say that boat races are never photographed, for there is ample scope at any regatta, and even the classic annual struggle on the Thames is excellently depicted. But the former are limited in number and in season, whilst the latter has to be left to the professional pressmen with their special opportunities.

Fortunately, however, a racing boat in motion is itself a sufficiently excellent subject to photograph. I have already enumerated the varieties of racing craft, and I may say that it becomes progressively more difficult as one proceeds from an eight to a sculling-boat to obtain a striking picture. The photograph of Ernest Barry (facing page 52) illustrates the scope which is possible in the photography of a sculler: it is particularly pleasing on account of the perfect style of the English champion. As one goes down the scale the length of the boat in proportion to occupants relatively increases until it becomes very difficult indeed to obtain a result which does not dwarf the oarsmen to an undesirable degree. I shall deal therefore at considerable length with the racing eight, as indeed the following considerations sum up the whole of the photography of rowing.

(1) An eight is over 60 feet long (even a skiff is 20 to 30 feet); therefore some depth of focus will be necessary in a lens if one is to depict the boat at close quarters sharp from end to end.

(2) At its fastest the velocity of an eight is only about 15 miles an hour: it is only forward velocity, too, which has to be considered, for the movement of the men is a simple pendulum-like swing. On account of the length of the boat, 15 to 18 yards is the nearest point at which,

using an eight-inch lens, one will expose. So that rowing photography comes into the category of slow-shutter work.

(3) From a photographic standpoint rowing is an exceptionally favourable subject. Everything is in the photographer's favour—light colours of boat, oars, and flannels, reflection from the water, and the absence of any dark objects in the vicinity, as well, of course, as the slow velocity of the subject, already referred to.

(4) It is in the photographer's power to make a pretty or an ugly picture.

The great length of a racing eight brings in at once an important consideration. If you work at close quarters with a short-focus lens, you are almost certain to find that "bow" and "cox" appear very far away from one another, and that one of them is ridiculously dwarfed. It is therefore infinitely better to let the eight get further away and utilise a long-focus lens, which renders the men in more correct proportion. Since also it generally occurs that photography must be conducted from the shore or a bridge a very long way from the boat, the long-focus lens becomes often both a necessity and a luxury. You are never going to give a shorter exposure than about 1-250th sec., and 1-100th sec., even at quite close quarters, is a good working speed, so even if your lens does not boast corrected components, never mind; use one of them well stopped down. I have seen a photograph of an eight published as having been "taken in 1-800th sec." Such a speed is ludicrously rapid. The more experience I acquire, the longer are my exposures, although I aim at filling the plate from edge to edge. If the light is actinic and you fear over-exposure at 1-200th sec., stop down. You will be

grateful for the added depth of focus, as you will soon learn after a few failures.

The first attempt on a racing eight should be the focussing of a stationary one. After the eight is launched, a few strokes of paddling take her from the shore, and the men "easy," preparing to start. You focus rapidly as the boat is slowly drifting or quite stationary, and then you have learned one valuable lesson—viz., how far the eight is to be from you if you are to get a conveniently large image. On the next day you can photograph at this distance, exposing when the "cox" cries "Paddle"—that is, at the very first stroke.

Using a reflex camera, a perfect result ought to be secured at the first trial, and such a picture is far from unacceptable; the intense effort the men exert in overcoming inertia of the boat is very well displayed. I find that when I stop down the front combination of my Zeiss Protar to $f/16$ I get the eight filling the entire plate (a rather oblique view) and sharp throughout. I ought to add that I took this type of photograph when working on the 'Varsity eight at Cambridge at about 3.30 p.m. during February: in the summer I should cheerfully stop down to $f/32$.

In taking the picture of the eight in motion, difficulty resides in the consideration that you are or ought to be biassed by the fourth criterion I laid down early in the chapter. You must aim at depicting either the beginning or the finish of a stroke and never the middle of the swing, for the last-named gives a very ugly and lifeless appearance. The finest position of all—one which is unfortunately the most difficult to represent—is that when the men are right forward with the blades square and about to drop into the water. Such a photograph faces page 64.

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I have premised that sharp focussing is essential and is helped by stopping down, and at first you will want all the depth of focus you can obtain. For as the boat is travelling you watch the men. Now they are in a desirable position, but will the image be too large for the plate? Shall I wait another complete stroke, or will that take the boat right out of the region of sharp focus? These are the perplexing problems which will flash through your brain; but after a time your judgment becomes amazing, and it is even possible to take the same boat coming towards you and going away. I have been quoted as having made the preposterous claim that I could also get in a third exposure when it was at right angles to the camera!

The most popular picture of an eight is taken from a bridge, exposing as the crew goes away from you. First of all, the bridge must be a suitable one—fairly high, but with an arch over which you can conveniently lean and with an approach which enables you to watch the eight from some distance away. You must use a long-focus lens to obtain a striking effect, and you will stop down, not to get sharpness throughout the boat but to increase the depth of focus, because you are hardly likely to know exactly where the eight will pass. The picture facing page 60, which shows Cambridge at Hammersmith Bridge rowing a trial course, was taken under great difficulties. I found the bridge packed with spectators, and I had really no idea where the eight would pass: so I hurriedly focussed on the water below and adapted my swing-lens, stopping down as well, with the certainty that whatever size the boat appeared it would at least be sharp.

As you acquire skill, you will ultimately aim at the representation of an eight so large that one end must be

cut off. The rudder must be sacrificed—of course, “cox” is not jettisoned—never the bows.

On narrow rivers it is possible to follow the boat along the bank on a bicycle, to get in front of it, and wait for an “easy,” so photographing at intervals. You will be able to judge where the boat will pass by the direction of the bows. As a variation, it is nice to take the crew coming towards you; the effect produced by eight straight backs swinging together and eight perfectly square blades is very pretty indeed.

Although early in this chapter I deprecated the photography of actual races, yet opportunities will of course occur. You must judge beforehand at which part of the race the struggle is likely to be keenest, and a narrow part of the river should be preferred. Remember that you must take the boats coming towards you if the crew further from you leads, and as they go away from you if the crew nearer you is in front: this rule gives the only chance of showing both boats.

So universal is the interest taken in the Inter-’Varsity race that I must include a few special remarks upon photographing the practice at Putney. The crews usually go out twice daily, but the photographer should patronise the morning outing. A few plates may with advantage be spent upon such subjects as “Bringing out the Boat,” “The Men taking their Places,” “The Spare Man Sculling” etc., which are all slow-shutter work and admirable examples of press photography. For that ever popular subject, “Bringing out the Boat,” get down to the water’s edge early and photograph as the boat is carried down through the avenue of people roped back by police. A still better picture is obtained from a boat on the river or, if you can obtain the

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necessary permission, from the boathouse balcony (see illustration facing page 53). At Cambridge I used to obtain a most striking result from the river bank opposite the Goldie boathouse, using a long-focus lens, an example of which faces page 61.

Mention of embarkation reminds me that if you are at Henley just before the regatta—a veritable paradise for the photographer—and an American crew is launching the boat, you can be certain of some uncommon pictures. The eight men enter the boat simultaneously, kicking themselves away from the shore—a spectacular mode of putting-off which an English eight very rarely adopts.

To return to Putney. Once the eight has got into motion, it very soon passes out of photographic range on the wide Thames, so an exposure must be made very soon after the start, even with a long-focus lens. But on some mornings when the water is favourable the boat passes very close to the bank and may be taken in full swing as large as you please. Try always when photographing from a bank to select a low one, because a crew taken from a moderate elevation tends for some reason to look very ugly.

I have had a couple of most enjoyable experiences at Putney when photographing Cambridge crews, and I mention them as they may be repeated by some of my readers. The first was the opportunity of photographing from the coach's launch, whereby one is quite close to the crew and able to follow them almost as if the eight was a stationary object. So near in fact does the launch go to the eight that my advice to use the long-focus lens on *all* occasions in rowing photography must be ignored, as the image obtained thereby is too large to be practicable.

The other experience was that of photographing from a

stake-boat from which the eight practised starting. If anyone ever has the chance to repeat my opportunity, I advise him to stand on the seat to obtain elevation ; to instruct the man at the end who is holding the rudder of the eight to lie low and keep low for some seconds ; to stand very firmly, for the stake-boat is jerked back violently by its anchor as soon as the eight starts ; and to snap at the second or third stroke.

I have already mentioned Hammersmith Bridge as an opportunity for obtaining a picture from a bridge whenever a full course is to be rowed, but the boats often pass under it during ordinary practice. To avoid disappointment it is advisable to go to the boathouses early, in order to discover if the morning programme of one of the eights includes a journey further than to Hammersmith : a brisk twenty minutes' walk along the tow-path brings one to the bridge. I need scarcely remind Londoners of the multitude of racing eights that can be photographed from Hammersmith Bridge all the year round, and particularly on Sunday morning. But the classic interest of the great race and the more perfect symmetry of the trained crews detract photographers from almost all other racing craft.

One final word of advice about photographing from a bridge. It will add greatly to your comfort if your camera has shoulder-straps, for you often have to crane over the bridge, and there is not a slight feeling of nervousness lest you let the camera fall, and this prevents good photography.

There are no specific details which apply to other racing craft. Coxswainless boats are naturally more erratic in steering and increase the difficulty of obtaining sharp focus ; but merely to multiply difficulties without being able to suggest help is futile.

At the 'Varsities, bumping races take the place of ordinary races. The aim of the photographer is to illustrate one boat just being bumped; and his triumph is co-ordinate with that of the conquering boat if his photograph shows that the bump has been made, by the arm of the "cox" in the vanquished boat being raised in acknowledgment of defeat. I found that my only plan was to wait on the bank for a boat in hot pursuit and likely to make its bump, and follow up ready to expose at the critical moment, resting satisfied with small figures and relying on depth of focus by stopping down. In this way I have often had as much exercise as the oarsmen.

It must occur to everyone, photographers or not, that there is a far greater chance of a photograph showing some discrepancy of style than of its being detected by an eye which has to watch simultaneously eight bodies, eight slides, eight blades. Further, even if the fault is visually detected, I have often seen it brought home to an oarsman at once by a photograph when an endless amount of patient hammering by a coach had failed to explain it. This is an additional reason for trying to illustrate the beginning or finish of a stroke, for if a man is only a tiny fraction of a second "late," he will be at once detected. I cannot pose as a rowing expert and may leave to readers the task of finding faults in the University crews reproduced. Anyone, however, can see in the photograph which faces page 64 that the boat was rolling, as is shown by the creases in "cox's" blazer and the splash by "stroke's" blade. Virtues of style are equally well brought out, and I shall not easily forget the triumphant exclamation of the famous Light Blue stroke, Mr. D. C. R. Stuart, when I showed him the very first picture I had taken of himself as a Cambridge

stroke—"There, and yet they say I don't get my shoulders on to it!"

ANALOGOUS SUBJECTS.

Canoeing, Punting, and odd events which are sometimes introduced in regattas as a relaxation from the more serious rowing will come into the consideration of this chapter. Without exception they are slow-shutter subjects with characteristic actions which make the typical instant for representation self-evident, so that no special instruction is needed.

CHAPTER XI.

THE PHOTOGRAPHY OF FOOTBALL AND OTHER WINTER GAMES

IN this chapter we encounter the photography of subjects the conditions of which are very unfavourable. We have to deal with rapidly moving objects, with non-actinic colours and surroundings in the worst-lighted months of the year—light of indifferent quality at its best, and often encroached upon by mist, fog, or gathering darkness. Here then is work for the strenuous; but the strenuous, if he wishes to retain his vigour, will do well to follow my first piece of advice, which is, to avoid the influenza bacillus and its congeners by never failing to go to a match in a good thick ulster and football boots, or at least footgear approaching that calibre. It is a good plan to have your overcoat pockets made large and deep to accommodate half-plate slides, and to be fastened very securely with buttons.

Photography at football may be conducted from the spectators' enclosure, from a grand stand, or, best of all, from the field of play itself. In matches of great interest it will not be easy to photograph otherwise than from a fixed point, and the pictures obtained, whilst they possess the advantage of classic importance, will be comparatively mediocre. In matches of lesser importance there is usually no difficulty in obtaining permission to wander about as a

free-lance, or at least to promenade the touch-line. The amateur will therefore be wise to patronise such matches, and leave the big ones to his professional brother, with whom he cannot hope to compete.

I will assume first, however, that you are going to a match as an ordinary spectator. Take up your position at or about halfway between the goals, and in the front row. I have seen the advice given to sit in a grand stand purposely to include part of the crowd in the picture in order to add realism. Well, *de gustibus non est disputandum* ; but, unless your aim is to exhibit to a person who has never seen a match a bird's-eye view of the proceedings, why presume so feeble an imagination that hats and umbrellas are needed in the foreground "to add realism"? No, get in the front row. If a wind is blowing, select the quarter towards which it blows, especially if the field slopes that way ; this is to ensure play in your vicinity.

It is evident that you will now want luck to help you, for it is conceivable that you might stand all the afternoon in that one position without the ball once coming near you. But, speaking from a fairly considerable experience, I will say that you will be very unlucky if within the first half-hour sufficient material does not come your way for half a dozen exposures, and remember also that it is in the first half-hour that you must do all your photography ; the light much later than 3 o'clock will render shutter-work quite impossible.

If I know one of the full-backs (I am dealing now with Rugby football), I tell him where I am going to stand, and ask him to "find touch" on my side of the field whenever it is a matter of indifference to him ; this is another attempt to ensure some play near to me.

You should set your focus at about 12 yards, use a stop of $f/6.3$ and a shutter speed of about 1-450th sec.; if your shutter is a lens one, you cannot work at such close quarters, but 25 yards will be your nearest point.

Your first picture should be one in which sharp focussing is easily accomplished, for it will not be very long before the ball is kicked into "touch," and whilst play is suspended you have time rapidly to focus the players waiting for its re-entry. Thus you obtain "the line-out," which is best taken slightly from one side, although a position perfectly straight in front is also pleasing; but you will, of course, have no choice in the matter if your position is an absolutely fixed one.

One would almost conclude that the "line-out" is to most professional pressmen the beginning and end of all football photography. It is the easiest episode to take, and although there is a great sameness about all "lines-out," yet week after week one sees them published in the illustrated papers. Vary your photographs of the incident by watching the men; you can obtain a nice typical representation as the forwards in the line jump for the ball.

But very soon you will pine to illustrate other episodes. I have always advised that the easiest plan is to fix your focus and let drive whenever anything comes into range. After all, the first essential is sharp definition, and no matter how excellent the grouping of figures, it will be only a mortification if it is out of focus. Early endeavours should be in the direction of including as many figures as possible to divide the interest. From "the line out" "a scrum" almost invariably supervenes, and the mass of struggling humanity is easily taken; or, if preferred, the sequelæ of "a scrum" may be awaited, and the ball

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ON THE BEDFORD LINKS : DRIVING OFF THE TEE.

To face page 97.



“HEADS AND POSTS.”



PRACTISING ON THE CAMBRIDGE UNIVERSITY POLO-GROUND.

passing from half-back to the three-quarters with the opposing side tackling is really a very easy episode to take, whilst it gives as excellent a representation as anything could of the spirit of Rugby football.

Still confining yourself to the inclusion of a number of figures, you can depict such an event as the rush of forwards with the ball at their feet when this occurs fairly close to the touch-line. Although a reflex camera is of great assistance, yet I never attempt to focus incidents "up to the last moment." My plan with all cameras is to focus on points on the grass right and left and keep the limits of sharp focus fixed in my eye: with a reflex my only alteration is rapidly to alter the focus (to a nearer point) if I decide that the players will be in a more critical position as they approach.

Later still your aim will be to pick out little individual occurrences. I am not such a hypocrite as to deny that luck plays its part in the securing of any stirring typical incident; but with a certain knowledge of the game, a complete command of your camera, and the trained eye of a high-speed photographer, occurrences soon become "inevitable," and such episodes as "Tackled," "A Forward Pass," and so on, although by no means easy to depict at the proper time and sufficiently sharp, are quite within the power of the more experienced photographer.

I have admitted the part played by luck, and indeed you will occasionally find that the negative displays quite a different grouping to that intended, as, owing to your anxiety to obtain sharp focus, you are unable to follow the rapidly changing stages of a movement. For example, the photograph "A Clever Swerve" (facing page 69) was taken at a very critical moment. The three-quarter was

racing down the field, and I waited until he had reached my zone of sharp focus, when his capture appeared inevitable ; in fact, I had "Collared" in my mind as the title of this episode when, as I pressed my release, he swerved away in an almost incredible manner.

Whilst it is quite possible to take these isolated episodes from a fixed point, I have always found it far preferable to move about the field in search of material. The final picture, for which admission into the centre of the field is almost indispensable, is "Kicking a Goal."

I have until now avoided all mention of Association football, and this because, although on the whole the more popular code, it fails to appeal to me photographically. In Association there are so few episodes ; the players are wider apart and scattered, seldom massing together to divide up the interest ; and the only subjects—if we are to judge by the productions of professional press photographers—appear to be the antics of the paid dancing-masters, as they are sarcastically called by Rugby devotees, jumping in the air to head the ball. As heading the ball is a very frequent occurrence, there is no difficulty in obtaining that type of picture if you have that ambition.

On the few occasions when I have photographed "Soccer" I have stationed myself near a goal and waited for something exciting to occur. The best grouping results from a corner-kick, and even the lens-shutter can obtain a good result if the exposure is made before the ball reaches the players. The representation of a goal being scored can be obtained sooner or later if you have the patience to wait, and you will, needless to say, patronise that goal which is likely to be the more bombarded. Stand behind the goal and well to one side, and practically

every episode in Association can be photographed from this fixed point.

HOCKEY.

The photography of hockey involves hardly any additional principles, and it may from the photographer's point of view be regarded as a combination of the two codes of football. One may stand near the touch-line and wait for the effective grouping which results after "a roll-in" has followed the ball being knocked into "touch," or one may station oneself as for Association football near a goal; or, finally, one may aim at depicting the very few episodes which occur in hockey, as "dribbling" or "sticks," on the lines I have mentioned for isolated incidents in Rugby. I always aim at including as many figures as possible, sacrificing size to this end. Movements in hockey are fairly rapid, and as in football the shutter should be set at about 1-450th sec.

LACROSSE.

Lacrosse is now firmly established in England, even if it cannot be said to resemble hockey in being a serious rival to the sway of King Football. It is not surprising that remarkably few lacrosse pictures have been produced by amateurs. For some reason, which I have never been able to explain, the game nearly always starts late—3.30, for example—and what sort of shutter-work is possible from November to March after this hour? Next, it is a game of extraordinary velocity; the ball is whirled more rapidly than one conceives until photography is attempted, so that slow-shutter work is futile. Finally, there is not the photographer's refuge—"touch"; the ball is never thrown out of play, but the limits of the field are the only boundaries

100 THE PHOTOGRAPHY OF MOVING OBJECTS.

enforced. The only means of photography are either to follow men about recklessly—a proceeding to which it is not improbable they will eventually object—or to stand behind a goal as in Association. I have taken a few small pictures in this way, but I am not proud of them. I have found, however, that a fairly effective grouping is still preserved if the exposure is made *after* a shot at goal has occurred, for which, of course, the shutter can be used at a much slower speed.

The best lacrosse photographs come from Canada, where doubtless more favourable climatic conditions exist.

ANALOGOUS SUBJECTS.

Bandy, I gather, does not differ appreciably from hockey. *Pushball* is a spectacular event rarely seen, and the photography of which is obvious and of slow-shutter type. *The Wall-game* of football is a modification peculiar to Eton. *Wrestling* (when it occurs out of doors) might cynically be regarded as analogous to Rugby football. As it is a subject of fixed position, sharpness of focus presents no difficulty, whilst interesting episodes may be left to the particular tastes of the photographer.

CHAPTER XII.

THE PHOTOGRAPHY OF CRICKET.

IN the chapter which dealt with the photography of athletic sports, I referred to the part played by photography in bringing to light faults and virtues which the unaided eye could never have realised. I might with advantage devote a whole chapter to this subject of action-photography alone, but space does not permit, and at least it forms a convenient introduction to this chapter ; for, as one would have expected from the complexity of its movements, cricket is *par excellence* the theme for the action-photographer. I doubt if a single person in the civilised world who takes any interest in sport is unacquainted with the work that has been done by Mr. Beldam, who, if he did not initiate action-photography, was at least the first to recognise the extent of its possibilities. I believe Mr. Beldam's earliest work was as far back as 1902, perhaps earlier ; but I can at least remember reading at that time a popular article by Mr. C. B. Fry dealing with this subject. I may add that until then action-photographs had not been accepted unreservedly. Most people regarded them as impossibilities or curiosities, or—kindest of all—as freak productions of imperfect mechanisms. One had to be educated up to such photographs until it was realised how

unbiassed was the eye of the camera—how very different from the human eye, which becomes confused and misled by the presentation to it of two occurrences within a shorter interval than 1-8th sec. Now we appreciate that our idea of an action is merely the beginning and the end of it, the intervening portion being filled in by the imagination, but capable of analysis, of course, by the camera producing those results said at first to be “impossible.”

Mr. Fry struck a loud note in favour of the photographer. He said: “From these photographs, if we are to accept focal-plane results as accurate—and we can scarcely do otherwise—we who bat and bowl and field come to see that we do not do any of these things as we thought we did, and such results must in a measure revolutionise many cherished ideas. *Photography may do much to institute a perfect style in cricket*, for, according to the camera, most accomplished batsmen of the day use their bats and their bodies and their feet in ways in which, according to the camera, they ought certainly not to do.” I have taken the liberty of italicising certain of these words in the extract I have made from Mr. Fry’s article, for they comprise a prediction which has been more than fulfilled.

Now, despite Mr. Beldam’s modest depreciation of his fame and his openly expressed wonder that nobody anticipated his work or has even ventured to continue it, I want to warn the reader that this is not the work for the ordinary amateur. Mr. Beldam is unique. He is, in the first place, a great cricketer, and can appreciate to the full what one ought to aim at in cricket photography. Next, he has, as a first-class player, opportunities for familiar intercourse with the leading cricketers of the day—an inestimable advantage. Finally, he is a skilful photographer, which I put last as an

accomplishment which can be emulated. I am glad to be able to include a short description of Mr. Beldam's method, which he has himself most generously supplied.

He uses a reflex camera planted on a tripod only four or five yards from the batsman. So short a range is a *sine qua non* in his opinion, and the danger to operator and to camera is not slight, yet he recalls very few accidents. "Once," he said, "Lord Hawke hit the camera and saw it falling, and, being a cricketer, he rushed forward and caught it and saved the situation as he has often done for Yorkshire! On another occasion, Bobby Abel, not knowing I was photographing him on the other side of the net, banged the ball against it, but with no untoward result, as I saw it coming in time and pulled away. If I have sustained no accidents, it can be attributed to the skill of the players." As release, Mr. Beldam has improvised an electrical arrangement with a wire of about thirty yards length. Not only does this enable him to watch the stroke played from a position of comparative safety, but he is often in the habit of bowling with his right hand exactly the kind of ball wanted, whilst holding the release in his left, the extra length of wire giving him an opportunity for his run.

We cannot hope to attain the high level that Mr. Beldam has instituted or to acquire world-wide reputations for the benefits that cricketers have derived. We shall not be tolerated close to the wicket in first-class matches, and even in matches of minor importance I never stand nearer than about thirty yards from the wicket, on the leg side. But Mr. Beldam may be emulated to the extent of taking photographs in practice if an arrangement be made beforehand for the batsman to play the stroke required. Thus, for my "Crisp Cut for Four" (facing page 77), I asked the

bowler to send up a "nice ball to cut," and although such a proceeding is a very humble form of "action-photography," it often happens that some interesting technical point may be shown. I understand that this photograph does not depict a faultless stroke, although the young batsman had a particularly pretty "cut."

Net practice so frequently precedes a match that the possibilities for photography are numerous. Without an electrical release it is obviously out of the question to take up a position on the business side of the net.

Bowlers, too, are easily taken either by arrangement or in net practice, and I am reminded of the occasion some years ago when Mold, at that time a very prominent Lancashire bowler, was repeatedly "no balled" by the umpire Phillips for "throwing." During the subsequent discussion the camera was called in to aid in the analysis of the bowler's action.

As regards exposures for cricket, we are dealing with multiple movements—ball and player; but it is the velocity of the ball which determines the rapidity of the exposure. Standing very close to the wicket, blurring is unavoidable even if the shutter is driven at its fastest. "A Crisp Cut for Four" received 1-800th sec. As one's distance from the wicket increases, the necessary exposure becomes much longer until the lens shutter can be improvised when a position of comparative safety is reached.

If one is working from the spectators' enclosure, the figures obtained are so tiny that the pictures are almost useless. But during the last couple of years telephotography has been applied to cricket with amazing results. We have become accustomed to see photographs of a match in

progress with the actual incidents of players being bowled, stumped, caught, or run-out ; and, however much one may sneer at the extraordinary perspective which is produced—all sense of distance being lost, and the bowler, wicket-keeper, and square-leg often appearing to be on the same level—yet one cannot fail to admire the skill in depicting such transient occurrences. I confess I do not know how it is done unless the pressman photographs every ball that is sent down.

ANALOGOUS SUBJECTS.

Baseball is seen very rarely in this country, and my ideas of the game are, candidly, derived from photographs by American workers, from which I venture to surmise that it is not so difficult to photograph as cricket—a rash generalisation perhaps from one who has never seen a game. But, needless to say, nobody would endeavour to photograph it without mastering its principles and observing the essentials to depict. As it is unlikely ever to become popular in this country, my lapse is a pardonable one : whilst should my little book have the fortune to cross the Atlantic, it will certainly not be perused there for hints on the photography of baseball when such evident experts in the subject are close at hand.

Rounders might perhaps occur as a photographic subject, and youthful reminiscences convey the idea to me that the episode of the game which consists in a fielder skilfully “picking off” the batter in his run is the only one which presents possibilities.

I do not think that any photographer has yet endeavoured to emulate the facetious black-and-white artist in his representations of such moving objects as “*Cocoa-nut shies*”

and "*Aunt-Sally*." I do not feel qualified to supply hints for excursions into this unexplored territory.

Quoits may be regarded as analogous to bowling in the photographic sense. It is a subject for low speed of shutter, if one desires to render the quoit in the middle of its flight, as would usually be the case. There would, of course, always be an opportunity for the ambitious to secure a very high-speed result by showing the quoit just leaving the hand.

CHAPTER XIII.

THE PHOTOGRAPHY OF LAWN-TENNIS.

THE universal popularity of lawn-tennis entitles it to a very prominent position in the photographer's eyes—a position which is supported by the very attractive nature of the studies which it is possible to obtain. One has only to watch a game for a very few minutes to see how difficult it will be to represent many episodes, and it is in fact upon "the service" that the photographer must largely depend. The size of the court precludes the possibility of photographing a general survey unless on a very small scale; but in "the service" we concentrate upon single figures under very favourable conditions. Moreover, just as a picture of the drive in golf is valuable as depicting in almost every case the characteristic of a player, so in lawn-tennis an opportunity is afforded by this comparatively easy study to photograph all that can appeal to the most fastidious, provided that a little trouble is taken to observe exactly what feature should be caught.

From the point of view of practice in photography any player suffices; but it is desirable to work upon crack players, for not only is the regularity of their play a great help towards successful photography, but their poses and the analysis of their strokes are interesting and useful to

inexperienced players. In this connection I may add, as the reader will probably have anticipated, Mr. Beldam has extended his cricket and golf researches to lawn-tennis, but I believe not to so considerable an extent.

You will find that at big tournaments the spectators crowd round Court No. 1, for the leading pair of opposing players start there. The comparatively inexperienced photographer will be wise to avoid this court and to start at another where his movements will be very little hampered. Having selected a player, he should watch him serve throughout one or even two games to decide what is most typical of his action. Thus some players throw the ball remarkably high up, and there are all sorts of variations in the position of the racquet whilst the ball is ascending: one leading player has a remarkable twist back of the body as he throws up the ball; Mr. Anthony Wilding's service is of a short, rapid variety, brimful of the energy which characterises the whole of his play; the ex-champion, Mr. H. L. Doherty, serves with a grace which, though evident in every stage of his action, can be best defined from behind; some players have a very well pronounced follow-through. These, then, are a few examples of characteristics to be distinguished and illustrated.

Focussing is easy; good players serve from the same point almost instinctively time after time. Now, what exposure is to be given? The ball is thrown up and descends comparatively slowly; when struck it travels at a tremendous pace—but that is another matter. The racquet is thrown back, however, very rapidly indeed—far more rapidly than one would believe—and it is this which will necessitate a comparatively rapid exposure. I say the ball itself moves slowly, for the lens shutter can depict it

quite sharply. It is, of course, actually stationary at the top of its height, and so here intrudes that blessed "position of rest" upon which some writers on the photography of moving objects insist. But, although it is easy to identify this position, I have already pointed out that it is only with a minority of players that this position is desirable; and, further, should you, relying upon the suspension of motion, give the much slower exposure promised, you may have the misfortune to hit off a period of time when the racquet is travelling backwards or forwards to strike. So, unless you are prepared to encounter much blurring of racquet, set your shutter at about 1-500th sec. for figures six or eight yards off. As the ball is an essential part of this picture, it is highly desirable to select a background which will not obscure it. I have had several photographs spoiled because, although the ball was clear enough when pointed out, it needed a sort of key map to distinguish it from the trees behind it. You cannot always choose your position, but a little enterprise may help you. At Cambridge Mr. Wilding always had a preference for one particular position for his service, which gave an ugly spotted background against the sun, until I pointed out to him how nice it would be if he selected the other side for *my* purpose. I don't say all champions will be as considerate as Mr. Wilding.

Another point to bear in mind is that you must keep an eye on the game; for, having focussed a particular player, he may cross over, as is the custom, every two games. If it is early in the set, he will return and serve again; but if you forget this point and dawdle, you may lose your man by the set finishing.

I think the "graceful" player is best taken from behind,

and to the right side (if he is right-handed), so that you catch him at the beginning or in the middle of his follow-through. Players who exhibit a lot of action should be photographed from a position absolutely at right angles, to show the racquet well thrown back, the ball comparatively low, and the body of the server alive with energy. For the player with a pronounced follow-through, stand facing the server on that side towards which he tends to follow-through.

A few other possible episodes are fore-hand drives, which are best taken in singles, for one may catch the player near the back-line (for this stroke ladies are particularly good subjects); and smashing at the net, in which you aim at depicting the player in the alert position, with the ball coming towards him, high up in the air; you do not attempt to illustrate the smash itself, for the velocity at that instant would transcend the possibilities of a shutter at its very fastest. It is a comparatively easy episode to photograph, if you will have the patience to wait for the inevitable bout of "lobbing," transferring your gaze rapidly from player to player until the crisis is clearly imminent.

Lawn-tennis displays, finally, an exercise in "training," upon the value of which I am never tired of insisting. I refer to the attempt to depict the exact instant when racquet meets ball in the service. It is useless as a photographic study, because it is just in this position that the player seems to display the minimum of movement, whilst the inevitable blurring of the racquet induces the criticism that the shutter is slow. It is useless also as an exercise, unless one works invariably upon the same player, for, as I have already said, the remarkably regular service of crack players, is a great aid to photographers. I studied Mr.

Wilding, and I used to find that I almost invariably exposed too soon ; but at my fourteenth attempt I got the desired position. Mr. Wilding's service is an exceptionally rapid one, and working upon other players I find I do not have to spend so many plates.

ANALOGOUS SUBJECTS.

Badminton (when played in the open air) may be regarded as coming into the scope of this chapter, but the velocity with which the shuttlecock is impelled is comparatively slow, so that the lens shutter could produce good results, encountering blurring only if the exposure was made with the racquet at its fastest. The Italian game *Pelota* I have never seen, but it appears to be a variant upon lawn-tennis or tennis, and I doubt if it is ever seen away from its home. *Tennis* and *Racquets*, like indoor lawn-tennis, are clearly outside the possibility of photography—at least from the point of view of moving objects.

CHAPTER XIV.

THE PHOTOGRAPHY OF HORSES.

It is quite a platitude to assert that for the successful photography of moving objects a very familiar acquaintance with their characteristics is often a *sine qua non*. In no subject is this more evident than in those into which horses enter, and yet these are the very subjects upon which photographers nearly always display the most profound ignorance ; they expect, in fact, to meet with success when their fundamental knowledge is so deficient that they literally do not know a polo pony from a hunter.

It is a work of supererogation to refer to the beautiful productions of Mr. W. A. Rouch, but I do so in endorsement of my generalisation ; for, notwithstanding his skill in all branches of "instantaneous" photography, he is certainly identified as *facile princeps* in the photography of horses, and he would himself admit that his success is in no small measure due to his profound experience of their ways.

It is now three years ago that I had my first opportunity to make a rapid survey of Mr. Rouch's work, and since then I have conscientiously studied the habits of horses with the hope of improving on the atrocities with which I had previously been satisfied, but which, after having once been put upon the path of righteousness, I promptly

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AN EARLY-MORNING JUMP INTO THE LAKE OF LUCERNE.



"THE BREAST-STROKE": EARLY EFFORTS.

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JABEZ WOLFFE ON HIS EIGHTH ATTEMPT TO SWIM THE CHANNEL.



WATER POLO AT CAMBRIDGE: "GOAL!"

destroyed. None of us can hope to rival Mr. Rouch in the branch he has made so peculiarly his own ; yet, despite his experience, he has that modesty which serves to encourage us neophytes, for he says : "There is a large element of luck. I cannot pick out what I want more than perhaps seven times out of twelve, so even the novice may hit it off, at least occasionally, but—and this I would emphasise—he must know how to recognise what really is good."

With this preliminary let me now enumerate the subjects in photography into which horses enter. We have ordinary riding and driving ; jumping either in competition, in the hunting-field, or in a steeplechase ; racing on the flat ; military sports (tent-pegging, etc.), and polo.

Now, although the exposures which are often given for horses in action are in my opinion unnecessarily short, yet there can be no doubt that we shall always be dealing with the "higher hundredths," and the lens shutter will have no scope at all. I will begin with a summary dismissal of *hunting*. I would go so far as to say that its photography is impossible had I not read articles, evidently by exceptionally gifted individuals, on how to do it. I have tried the method advised, which is to follow the hounds on horseback with a camera, and I very soon found that photography was quite outside my competency : a camera large enough to be of any service got almost shaken to pieces ; one small enough and compact enough to be easily carried, and which could really be used from the saddle, was useless for serious work. Of course, I am not alluding to press pictures of "meets," "personalities in the hunting-field," and so on, as for these pictures you need not ride at all.

It has also been said that photographs of the fox, the

pack, and everything else in full cry *have* been taken. I have never seen such pictures, and I can only marvel at the luck of the photographer who was on the spot at a critical moment when hounds were close on the fox, whilst he was in a position of vantage and yet obscured, or verily he would soon have turned the fox!

Racing is so popular a subject for the camera that I deeply regret that my experience of the turf is too little to offer many photographic hints. There is usually no difficulty in photographing either at a corner or more conveniently from one of the higher priced "rings," and, although there is nowadays a tendency to take the race at right angles, I think that an end-on view gives the most graphic representation. You will, of course, be prevented from very close proximity, but the subject is too rapid a one for a long-focus lens to be employed, and you must rest content with comparatively small figures giving an exposure of 1-400th-1-600th sec. It is, of course, the classic interest attaching to races which attracts the photographer; but I have always found too great a sameness about photographs of horse races to induce me to go to the trouble and expense of visiting the big meetings.

The same applies to steeplechasing, for, with the exception of point-to-point meetings, the amateur will find it exceedingly difficult to select favourable positions, and yet I am sure that no photographer who has seen Mr. Rouch's famous pictures of big jumps, and falls at big jumps, can avoid a pang of envy or fail to desire to emulate these photographic achievements.

Even with a not inconsiderable experience of focal-plane work, I must admit that I have been so astounded at the photographs which depict actual falls that I asked Mr.

Rouch point-blank for his receipt. "Nothing but patience," he answered, "and, of course, experience of steeplechasing. One gets to learn, after seeing a large number of races, that certain jumps are very difficult to negotiate, and likely to cause trouble. I take up my position [I may add from my own observations of Mr. Rouch, "quietly and unobtrusively"] and wait, that is all!"

But Mr. Rouch is anxious to deplore mere sensationalism, which is unfortunately only too often the key-note of press photographs. The photograph of a fall is a very different thing from the photograph of an unlucky horseman clinging to the neck of his steed, and Mr. Rouch very strongly condemns the man who would photograph incidents which do not reflect the spirit of the sport, and who is only too anxious to secure events which have not happened "according to the books." He himself has done a great deal to set the standard for us by bringing to light the possibilities in "instantaneous" photography of producing really artistic studies. We must follow his example, study the action of the horse, and then start photographing, further emulating Mr. Rouch in his principle of destroying any negative which depicts ugliness of action.

The best opportunities for photographing horses jumping will be found at the many "shows" held all over the world. On the Continent feats of horsemanship are cultivated to a far greater extent than in this country, but for some reason or other I have always found when photographing abroad that the backgrounds are very unsuitable. The Italians are remarkably adept in that variety of equestrianism which consists in riding a horse down a very steep and precarious path. I have never had an opportunity to photograph such events, which are produced as examples

of very high speed work, although to me they appear as if a shutter of the very slowest type would be adequate.

There is a very great tendency to stoop down when photographing a horse at a jump, and this is because close scrutiny of a horse jumping shows one that the animal is clever enough to clear his obstacle without rising any higher than is necessary, and very often the photograph gives the impression that the horse is just crawling over. But I am firm in the same principles that I laid down in Chapter IX. when treating of the photography of men jumping; if you stoop down, you are certain to produce more or less obvious distortion.

Never use a tripod in photographing the jump. I did once, and the horse, seeing a strange object, "refused" and swerved towards me, to the discomfiture both of myself and the rider, whose opinion of photographers was at once freely expressed. Even with a hand camera caution must be exercised. I do not think, however, that horses become frightened so much as interested in something which is outside the business with which they are occupied, and I have never had any trouble when using a hand camera standing on the far side of the jump in shadow.

The exposure for a horse jumping naturally depends upon the size of the image. If you give the same exposure as you would for a hurdler at the same distance, you will be sufficiently accurate.

The photography of *trotting* involves no difficulty, for one focusses a point upon which the eye can fix and watches the fore-legs. Although it is objectionable to have a very conspicuous fixed point, I find it very convenient to carry with me a small metal rod which I stick deep into the ground at the side of the track, as it can be clearly seen some

distance away and does not appear too prominently in the negative. The procedure must be slightly different if you are making an attempt to pick out the striking feature of a trotter with action, and it is best to aim at an oblique view which will give you relatively more depth of focus. It is difficult, of course, but in my experience it is not so difficult as would at first appear, because there is a good deal of action relatively to the distance covered. In photographing *driving*, in the same way the leading hoofs are watched until the fixed point is reached.

Ever since the first photograph was produced which showed a horse trotting with all four hoofs simultaneously off the ground, most photographers have set out to repeat this method of analysis of movement. It is nonsense to suggest that success is ever anything but a fluke, for who could watch four rapidly moving hoofs? It has been regarded as a great feather in the cap of the photographer, because his results gave different representations of a horse's action than those selected by artists. But it must be remembered that the artist aims at suggesting motion, whilst the photograph which is accurate scientifically will only suggest motion if by chance an incident in the movement is secured which agrees with the artist's representation. It is a matter of interest, however, that modern artists, even if they do not accept and slavishly follow the productions of the focal-plane shutter, are clearly drawing upon them for inspiration, as even a casual comparison of contemporary sporting sketches with those of, say, twenty years ago will convince anyone.

The chief difficulty associated with the photography of *polo* lies in the range of the game, which is played on a ground two hundred yards long. A certain amount of

walking along the touch-line is advisable, especially if a reflex is used ; and, as in football, the existence of "touch" is the photographer's refuge, as there is an opportunity to focus the point of re-entry about which the players congregate whenever the ball is hit out of play.

I do not attempt to aim at isolated episodes ; but, as only four-a-side take part, I photograph at a distance and include as many players as possible, giving exposures of 1-250th-1-400th sec.

The most familiar events in *military sports* are "tent-pegging," "lemon-cutting," and "heads and posts." From a photographic standpoint they are all easy in that there is a definite point to focus and a critical moment for exposure. It is of great advantage to photograph regular soldiers, who are much more skilful in these feats than amateurs, and occasionally one will be enabled to depict three or four riding abreast, all successfully dislodging their pegs.

It is not easy when photographing "tent-pegging" to decide in time whether one will expose or not, as one naturally wishes to show the peg on the lance, and the horse is ridden at full speed. Never be persuaded to lend yourself to such a deception as sticking the peg on the lance beforehand and photographing as the rider leans down in the orthodox position. I think the most typical picture is obtained after the feat has been accomplished and the lance is being carried back over the shoulder. Take up as straight a position as the horse will permit you ; exposure should be 1-500th sec. or faster according to proximity.

"Lemon-cutting" requires no special skill in photographing, and "heads and posts" is easier still, because the horse is not ridden very rapidly and the rider seldom fails to

make a cut which, even if not quite accurate, will not dislodge the "head."

Exposures for these last two events may be much slower than for "tent-pegging."

I have deliberately included two illustrations of horses in action as "horrible examples." (These reproductions face page 97.) Both are specimens of the fastest "instantaneous" work; both are perfect photographic achievements in the sense that the exact instant for exposure has been selected; but both are hopeless failures as convincing examples of "action." Thus, in "Heads and Posts," one sees that a fine cut has been caught, for the "neck" is seen flying whilst the "head" has only just started to fall. The polo player practising shots has likewise been caught at a critical instant—but how absurdly wooden both horses appear!

I have only to repeat that there are desirable and undesirable attitudes in the action of a horse, and that by experience and practice the photographer can obliterate the ugly ones.

ANALOGOUS SUBJECTS.

I have now to mention a considerable number of moving objects which are not strictly analogous to the subjects considered, but whose inclusion is suggested by their association with animals other than horses.

Unfortunately I am not in a position to do more than give a bare enumeration of these subjects. *Coursing* and *Whippet-racing* are not popular subjects for the photographer, and I think this is because the representation of a dog at full speed with its legs bunched up is far from realistic. The shutter must be used at its fastest speeds, for the small size of the animals necessitates as close proximity as possible.

Otter-hunting affords excellent scope for the camera, and it is a subject into which the lens shutter can enter. Like the rest of the moving objects included in this chapter, success can only be obtained by an expert acquaintance with the details of the hunt.

Shooting is a disappointing sport to photograph, but I have more than once secured a result which showed the smoke from a gun and a falling bird, although luck naturally has a very big share in such an achievement. A covey in full flight, with the guns up in position, is another type of picture to aim at.

Archery is conveniently mentioned here: I have never seen an attempt made to photograph it as a "moving object."

Falconry, which from drawings would appear to have artistic possibilities, is, I believe, extinct in most parts of the world.

The photographer who would attempt to illustrate *Cock-fighting* and *Bull-fighting* must be prepared for censure from humanitarians for assisting even passively at these oft-styled brutal exhibitions. I have never been in a position for my casuistic principles to be tested, but I recollect some very striking pictures of cock-fighting creating quite a furore a few years ago; they certainly demonstrated the possibility of suggesting evidence of motion. Bull-fighting pictures have long been familiar through the intermediary of the cinematograph.

Finally, I must allow *Angling* to come trailing in here, mainly because I have no idea where else to place it. Ordinary angling is much too tame for the photographer of moving objects; salmon and tarpon fishing have often been successfully achieved, but never by me. Expert piscatorial

knowledge is essential, and I understand that the *modus operandi* is to watch the tautness of a line and estimate its distance by a series of coloured objects, keeping the lens focussed for the appropriate distance, so that when the fish leaps, it will be sharply rendered.

I cannot but apologise for the scanty treatment of "analogous" subjects which closes this chapter, for I have done little more than enumerate possibilities which have never been possible to me. At least, I can thankfully reflect that the man who would desire to undertake their photography would know sufficient of their details to render him independent of hints which would be technical and not photographic.

CHAPTER XV.

THE PHOTOGRAPHY OF DIVERS AND SWIMMERS.

DIVING has always been a very popular subject for the focal-plane enthusiast, probably because the results appeal to the general public as conforming exactly with their ideas of what happens. It is only too frequently the case that those high-speed results which require the least skill on the photographer's part receive the greatest credit, and reversely; and, on the whole, I think that pictures of diving receive disproportionately great approbation.

On the one hand, one must concede the necessity for a very rapid shutter; for although the subject is not one of extraordinarily high velocity, nor does it comprise additional movements of limbs, etc., which determine a brief exposure, yet it is a subject which must be photographed at very close quarters and, generally speaking, to obtain the best effect, almost at right angles to the camera.

On the other hand, the conditions are in the photographer's favour, for the advantage of light reflected from the water is not a slight one: he will be expected to undertake such work only in the better lighted months of the year; and, finally, the difficulty of obtaining sharp focussing is almost at a minimum.

The photography of divers at the seaside is a branch in

itself of which I have had very little experience, and, in order to give hints on this subject, one would have to be acquainted with the special peculiarities of every seaside place at which diving was practised. I have done most work in those large baths inland which are sheltered off, and in which a real difficulty is introduced by the trees obscuring the light. But no advantage is ever unqualified, and in these baths the photographer is enabled to take up the very best positions without the trouble of working from a rocking boat or of risking his life by climbing down the foundations of pier-heads, as he will be encouraged to do when working at the seaside.

I aim always at including the diving-board in my field and at exposing when the diver is a comparatively short distance from the board. I think this gives the most graceful position, and it is certainly an ambitious proceeding to obtain the maximum size of figure. If, however, one has the advantage of a clear background, it is best to retire to a greater distance, when it would be possible to command the entire range of the field from the board to the point of entry into the water.

If you aim at a picture of the first type—an illustration is given facing page 128—ask the diver to make a rebound and not a running dive, so that he will not proceed far from the board. Focus at least one example of his diving, for your margin of error is a very small one. The focal-plane shutter need not be used quite at its highest speed, but you may as well give the most rapid exposure you can if you are so fortunate as to be working in the most actinic circumstances.

A picture of the second type is obviously a very much easier one, and, as a diver proceeds almost invariably in a

straight line, it is almost impossible to fail to obtain a fairly good result. The exposure can, of course, be very much longer, and even the lens shutter at 1-100th sec. can attempt this sort of work, although a little blurring is almost inevitable. Diving is one of those examples of objects in motion with a certain "position of rest," and it is also one in which the advice is given to regulate the direction of movement of the shutter's slit according to whether the diver is rising or falling. I have referred to these questions at greater length in Chapter III., and will only say here that in my opinion they are not worth taking into consideration.

Trick diving involves no special photographic features. The back somersault or the simple back dive must be taken very near to the board. Rarer feats, such as the flying dive over another man's back, a number of men diving simultaneously, and two or even more men diving from one another's shoulders, have critical moments which are perfectly obvious.

The alternative method of entering the water by jumping also presents photographic possibilities; but the result will be unconvincing unless the background is a distant one and the impression of a man clearly leaping into space conveyed. It is necessary, therefore, to stand behind and also at a lower level than the board, sufficiently to one side to show the board itself. I have nearly always found that this position is a possible one, and it is by no means a bad one from which to expose upon divers also.

SWIMMING.

Here one encounters a most unsatisfactory subject. All that one obtains in a photograph as a rule is more or less of the swimmer's head and perhaps an arm raised out of

the water. It is useless to attempt the photography of a hard race, for the splashing quite obscures the whole of the figures, and barely sufficient is evident to show that swimming is in progress at all. The photographer must have a very bright day with calm, clear water through which the swimmer's body can be distinctly seen. Exposure should be made on the occurrence of the very slight splash which the striking hand makes in an over-arm stroke; to show a breast stroke convincingly, a perfectly straight view is desirable. It will usually be difficult to determine the exact path the swimmer will take, but sharpness of focus may be made more certain by liberally stopping down, as is quite possible with this comparatively slow subject under very actinic conditions.

Swimming photography naturally acquires a very different aspect on such occasions as swimming the Channel, when every effort must be made to reproduce the most trivial incidents in view of the importance of the occasion. The illustration facing page 113 shows an attempt by Jabez Wolffe to swim the Channel, and it was taken from the deck of the little steam yacht which kept alongside the swimmer throughout (to be perfectly accurate, Wolffe kept alongside the yacht). More usually, of course, one is unable to photograph swimmers from so favourable a position, but from a point on shore or from an anchored boat.

WATER-POLO.

There are several indoor baths sufficiently well lighted to enable the moderately high-speed exposures necessary for this subject to be given; but it must be remembered that most indoor water-polo matches are played *at night*. The few matches which are played in the open air are

the only ones which will come within the scope of the photographer.

Water-polo can be regarded as football played in the water, so that I need do little more than repeat my advice given in Chapter XI., either to focus on a spot in the field of play and let drive whenever anything likely to be of interest comes into the range of focus, or to focus a goal and photograph the usual stirring incidents in its vicinity. But the movements are very much slower than those in football, and it is much easier to pick out episodes, whilst exposures need never be more rapid than 1-400th sec., and I have often done excellent work with a lens shutter.

CHAPTER XVI.

THE PHOTOGRAPHY OF GOLF.

To the photographer the leading features of golf are the lack of seasonal incidence (golf is played throughout the whole of the year, and under practically every climatic condition except fog), and the very great velocity not only of ball but of limbs and clubs. It is almost entirely a subject for the focal-plane man, who will be wise to restrict his work to the summer months, since he will often be compelled to use his shutter at its fastest. From one point of view, golf is a very satisfactory subject to the photographer. I think it is evident that certain of my chapters suggest at least a practical acquaintance with the sport which is to be photographically treated, and by a practical acquaintance is often meant rather more than the amateur who is not by nature an athlete is prepared to claim. But, although I am willing to admit that the crack golfer who is also a photographer is bound to obtain more striking pictures out of the knowledge which can result only from considerable experience, yet, in general, the strokes are few, and they are stereotyped and comprehensible to a man who has never hitherto been on the links, let alone handled a set of clubs. Excluding therefore the successful portrayal of technical features, which is only possible to an expert of the type of

Mr. Beldam, all that is needed is the usual acquaintance with the details of "instantaneous" photography.

For his initial efforts the photographer had better accompany a friend who will play a round for his benefit. One will therefore start with the photography of "a drive." Have you ever realised the remarkable velocity with which a golf-ball leaves the tee? You will never do so until you attempt to photograph it soon after the impact. It took me a very long time to obtain such a photograph, and, curiously enough, with two consecutive exposures on the same afternoon, I showed the exact instant when the club-head met the ball and the position of the ball when it had proceeded little more than a foot from the tee.

In both photographs the club is blurred beyond recognition; in the second, the ball is represented by an elongated structure, and, judging by the size of adjacent objects, I estimate the extent of movement of the ball as three inches, the exposure (in a recently tested shutter) being "1-1200th sec." If the exposure were correct, the velocity of the ball works out at 300 feet per second, or over 200 miles an hour.

Scientifically speaking, such a method of calculation is ludicrously inadequate, and yet my figures have been liberally quoted, whilst nobody has taken the trouble to repeat the work. Moreover, the late Professor Tait obtained an almost similar result by a mechanical method of undoubted accuracy—which is sufficient assurance of the incorrectness of my result, as his subject was his nephew, Lieut. Tait, a prodigious driver, whilst the player I photographed was not out of the ordinary.

Of course, the velocity rapidly dies down, and the club is comparatively slow in the follow-through. Nearly all the photographs of golfers driving, hit off the follow-through—a

To face page 128.



A GRACEFUL DIVER: IN THE BEDFORD BATHS.



“TEACHING THE YOUNG IDEA.”

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The Badminton Magazine.*

To face page 129.



HOOP SKIPPING.

position which is, of course, a very easy one to depict and which fortunately, as I shall show later, is the one least likely to interfere with a player. Mr. Beldam says that the most characteristic attitude and the one most likely to be instructive is "the top of the swing," and he states that his method to secure this very difficult position is to watch the man's wrists and not the moving club.

After what I have said regarding the velocity of the drive, I think it is evident that you must use the shutter absolutely at its fastest, no matter the position of the player, unless you deliberately attempt to take the follow-through. The ball is such a tiny object that its evidence in the sharpest picture must always be problematical. At the end of the stroke, the player is generally quite stationary, and the lens shutter will depict him without blur.

To deal now with other episodes. Iron shots have no particular attraction for the photographer unless he is a specialist, and excepting, of course, the "bunker shot," which is *par excellence* the "pretty photograph."

For this photograph one desires to expose when the player is hitting the ball out of the bunker, and to show the ball, flying sand, stones, or other débris of which the bunker is composed. If during the round your friend is so skilful as to avoid being "bunkered," he can easily stop on his way and play a special shot for you. In this case you may as well be certain that the ball is placed to advantage: put it fairly low down and embedded in so much sand that a good cloud will be formed, and yet not too much sand, or the easy passage of the ball will be prevented; then instruct your friend to hit the ball well over the top of the bunker, but no harder than is necessary to

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clear it. Stand behind and to one side, and watch for the ball—exposure at close range, 1-450th sec.

Putting photographs, which are easy to secure and require only a slow exposure, have the disadvantage that evidence of motion will always be far from obvious.

If one has the opportunity to secure a number of photographs of a big match, the procedure should be as follows. Get to the links early and identify the well-known players, then when the first pair start accompany them, photographing any interesting incidents such as drives, bunker shots, putting. By the time you have reached the sixth hole perhaps, call a halt and wait as the other pairs arrive, when you can photograph any player you please, putting or driving. Like "the service" at lawn-tennis, the drive at golf is regarded as the characteristic feature of the player, but a sharp look-out must be kept to secure anything special that may be well known in the world of golf. For example, Mr. A. G. Barry, who, whilst a school-boy, was amateur champion in 1905, is famous for his long follow-through; so much so in fact, that the "Barry-swing" is (or used to be) a familiar expression. His brother used to putt with a somewhat unorthodox instrument which resembled a croquet mallet. I believe the mallet putter has now been abolished, and at the moment of writing the Schenectady putter is under discussion. Such rare incidents as a ball being driven on to the roof of the pavilion, as once occurred in an Inter-Varsity golf match, or right off the links on to the public highway, as in the Amateur Championship of 1907, give opportunities for press photographs which should on no account be missed.

When photographing at matches the behaviour of the photographer must be absolutely beyond reproach. Not

only must the camera be unobtrusive, but on no account should the exposure be made *before* the shot has been played, as a shutter of high tension makes a considerable noise on going off—almost a terrifying noise to a player whose nerves are on edge. Fortunately very few photographers are skilful enough to show any other feature of the drive than the end of it, which accounts, as I have already said, for the very great proportion of this type of photograph.

Do remember the first of the eight rules which comprise "The Etiquette of Golf"—*Never move during a stroke*. It does not matter how far you may be from the player at the time; the slightest sound, change of position of shadow, or other trifle, may put the man right off his stroke, and if his temper is becoming shortened by bad luck, he will probably express his resentment with, what may seem to you, disproportionate severity.

Finally, I have been stigmatised as "ungallant" because I have advised that ladies should never be photographed. Surely this advice is a proof to the contrary. The golfing girl looks charming in her Tam-o'-shanter, jersey, and short skirt as she starts for the links—but in action! My critic spoke of the "swirling skirts of womanhood lending piquancy," but all I see are the features distorted by exertion, the fore-shortened elbow, the coat or jersey in innumerable creases, the feet twisted and in a position which gives a sad caricature of the kindly gifts of Nature, all combining to yield a result which will make the photographer very unpopular with the fair sex.

CHAPTER XVII.

THE PHOTOGRAPHY OF "COMMON OBJECTS."

I AM afraid that I have occasionally been guilty of a little intolerance in condemning the productions of other photographers of moving objects when writing on the subject of "posed" pictures. One can hardly fail to be struck by the nature of the photographs which are generally to the fore in a competition devoted to "subjects in which there must be evidence of motion." Very rarely indeed does the "instantaneous" photograph which needed at least something approaching instantaneous determination come into its own; but the prizes go to the fully exposed, cut and dried, high-speed results which are taken at leisure, after careful posing, in selected sunlight.

It is partly for this reason that I feel so savage with those horrible studies which show four (and even five!) athletes jumping one or at most two hurdles. Not only is such an illustration an example of posing, but to anyone who has seen a hurdle race the absurdity of the conditions makes it almost offensive—five men over two hurdles and the photographer obviously impeding their subsequent path!

Now, it is perfectly true that the photographers of such incidents are often men who are quite alive to the absurdity, and their argument is at least specious. "It is useless,"

they say, "to try to educate the man in the street in this matter, and to make him see which photographs really are difficult to secure; he can understand the pictures you condemn, and so he likes them, and the promoters of competitions know that he likes them. If we did not publish such pictures somebody else would."

I feel that there is no satisfactory answer to such an argument except perhaps to plead *noblesse oblige* to those photographers who know better.

But the "posed" picture has its uses. You cannot always find football matches or athletic sports, and the enthusiastic focal-plane man deplores the waste of the least bit of brilliant sunshine. Let him therefore exercise his ingenuity to improvise a subject the photography of which will keep him in training, will give him exercise in the development of extreme high-speed exposures, and will also afford him an opportunity to obtain that type of picture which may earn him much gold and universal admiration.

The simplest domestic utensils suffice—something to jump over and somebody or something to jump it, and you have a complete field of operations upon which you can enlarge according to your opportunities. I remember once making an attractive series by depicting the stages of "a steeplechase" in a garden. Six members of a family of convenient ages divided themselves into three jockeys and three mounts. Hurdles were manufactured out of laths supported on broken flower pots—a hurdle need not be very high if the "jockey" is of generous proportions—and a water-jump was constructed out of a flat bath filled with water and the edges concealed with grass and leaves. "Falls," both "posed" and unintentional, were introduced, and the proceedings which I have described merely as a

suggestion formed a very pleasant summer afternoon's occupation.

A "posed" subject which can nearly always be arranged at short notice is *skipping*, and I can thoroughly recommend it as one of the very best exercises for the focal-plane photographer. I advise the use of a hoop and not a rope, for evidence of motion is much more clearly suggested.

You will, of course, select a very fine day and work at close quarters to take an opportunity of employing the very fastest speed your shutter can undertake. In the illustration which appears facing page 129 I used so rapid a shutter that I could not have avoided under-exposure with a smaller stop than $f/4.5$. In Chapter II. I stated that during the last six years I had made very few exposures with a larger stop than $f/6.3$; this occasion was one of them. It will be seen that in my illustration the back of the hoop is not perfectly defined, and I think this is due to the slight depth of focus with so wide an aperture; the young lady's face was focussed, and even the comparatively short distance to the back of the hoop is outside the range of sharp focus at $f/4.5$, working at close quarters.

I make two small marks for the feet and ask my subject to avoid moving away from them during her skipping; if this precaution is not taken, she will very soon get out of the region of sharp focus. I have never had an opportunity to obtain the co-operation of more than one skipper, but a very pretty picture could be arranged by posing three little girls and appropriately starting them to skip so that different stages would be shown. The figures would be smaller and exposure could be longer, and one at least of the girls might be placed at right angles to the camera. But, for a single figure as large as in the illustration I include, I

am convinced that the focal-plane shutter at its fastest could not render the hoop sharply if taken at right angles. "Teaching the Young Idea" is a good example of what I call a "posed" picture. I include it with the suggestion that it appeals also through its somewhat catchy title, the importance of which I refer to at some length in Chapter XX.

I need not occupy more space in the enumeration of other familiar moving objects. I should, however, like to remind readers of a familiar subject that is well worthy of attention, and that is the operation of driving in a pile by four navvies whirling large hammers in succession. It is not much of an exercise in timing, for, when the four men are working rhythmically, almost any point of the cycle will produce the same result; but it will afford an excellent opportunity to practise development of a high-speed exposure if one stands very near to obtain the maximum displacement.

CHAPTER XVIII.

THE PHOTOGRAPHY OF "WINTERSPORT."

THE subjects which are included under *Wintersport* are skating, ski-ing, tobogganing in all its varieties, and a few other sports associated with ice, such as ice-hockey and curling.

Of these the last-named does not afford sufficient evidence of motion for the photographer of moving objects, whilst there are no details peculiar to *ice-hockey* that are not referable to hockey in general. But, as additional interest necessarily attaches to a game being played on the ice, one will not be so ambitious to secure pictures of large size and stirring incident as when photographing ordinary hockey.

Speaking generally, England is out of the question for the photographic representation of *Wintersport*. Our winters have, of recent years, been so uncertain that only in isolated parts and for very short periods has sufficient ice been found for more than a few hours' skating, whilst the comparatively light falls of snow preclude the practice of tobogganing and ski-ing. In Switzerland, as is well known, there is now a tendency to regard the winter season as more popular than the summer, and, although occasionally a winter may be unfavourable, one will be very unfortunate if, during a fortnight's visit, opportunities to photograph

Wintersport are not plentiful. I understand that the climatic conditions are even more favourable in Norway, but I have had no experience there.

Let me warn the photographer, even the experienced focal-plane man, that he will find this work very much more difficult than he anticipates. My first warning to him, though a simple one, is very important. If he is going to a Swiss winter resort entirely, or even mainly, to photograph, he will be wise to make a few inquiries about the special climatic details of the place, for the quantity of sunlight differs enormously at different places, and at more than one the only hours of the day when brilliant sunlight is present are between eleven and two, when perhaps the exponents of *Wintersport* are not performing at all.

The second warning is regarding the nature of the light in Switzerland and is almost unnecessary. The danger of over-exposure in the powerful actinic light encountered is not very great when one is giving very high speed exposures, as will nearly always be necessary; but special care must be exercised in development to avoid extreme contrasts. I found it best to develop daily to check my results and repeat if necessary; and this is a plan which is nearly always possible in Switzerland, as most of the hotels have dark-rooms with excellent accommodation.

If you believe that a two or three times screen is any use at all, then its application is certainly indicated here in conjunction with an isochromatic plate, for very rapid work is still possible in these circumstances if a focal-plane shutter is used, whilst with a lens shutter there should be no difficulty in employing its highest speeds without the least danger of under-exposure.

Skating is a disappointing subject to the photographer;

it is so difficult to give any convincing evidence of motion. There are no special photographic hints, but it is of much more importance to elicit the services of a skater who is fully conversant with continental styles and who will be able to supply the maximum action for you. I am speaking of figure skating, for an ordinary skating race will be photographed in the same way as a foot race. Working at close quarters I have never found it necessary to give a more rapid exposure than 1-400th sec. for the details of figure skating, and one often sees excellent results with a lens shutter at its fastest speed.

My experience in photographing *ski-ing* may be an unusual one, but I have always had a great deal of trouble in reaching the field of action when encumbered with a camera of useful proportions. Unless one is able to represent the jumper clearly in mid-air, the picture will be very tame; and, although the majority of photographers stand below and take the jumper as if he were descending on their heads, I think it best to take up a position from behind to obtain a result more or less like that of the jumper which is illustrated facing page 112. Unfortunately such a position is rarely possible.

Ski-ing is essentially a subject for the focal-plane shutter's higher speeds, for the forward velocity is considerable.

In photographing *tobogganing* one encounters once more the difficulty of suggesting motion, for it must be admitted that the majority of pictures one sees are unconvincing in this respect. One selects, therefore, a part of the course with a considerable slope and preferably at a corner, so that, from the appearance alone, it is evident that the object must move. There is no difficulty in obtaining a marked spot at which to expose, much on the same lines

as in photographing a railway train. The velocity varies enormously, and the exposure must vary correspondingly from a speed of which a lens shutter is capable up to the highest speed obtainable with a focal-plane shutter.

The best pictures can be taken on the famous Cresta run at St. Moritz, and I believe I am correct in saying that on this run the greatest velocity is obtained. A particularly striking photograph may be secured from the railway bridge looking down upon the track.

It is occasionally possible to photograph tobogganing in England, but in my experience the results hardly justify the trouble. There is not a definitely marked ice-run as a rule, and the toboggan careers along in an uncertain direction, which not only makes it difficult to determine some fixed point at which to expose, but may even be a considerable source of danger to a photographer who is aiming at a large image, through some sudden unpremeditated deviation in its course.

Curling, although doubtless usually photographed as a "moving object," is a sport involving too little evidence of motion to demand attention here.

CHAPTER XIX.

THE PHOTOGRAPHY OF "SPECIAL" SUBJECTS.

ALTHOUGH the entire contents of this little book may be regarded as a special branch of photography, I think that the reader who has paid me the compliment of reading all the preceding will readily believe that the photography of moving objects embraces a wide range of "specialties." For, just as a man who is fairly good at most sports for absolute pre-eminence must confine himself to one, so it is with their photography; and there are accepted experts in the photography of rowing or athletic sports, specialists in the photography of divers and of horses, of ice sports, or of cricket — ladies and gentlemen possessing either an exceptional natural aptitude or unusual opportunity to spread themselves on some particular subject.

Had it been possible for these experts each to have contributed a chapter on his or her own branch, this little book, whilst it would have failed to have held the interest that attaches to the production by one pen, would have had the merit of authority which none could gainsay. But for many reasons such collaboration was impossible.

Although I have presumed to deal with a number of subjects which are in themselves "specialties," and with which I cannot claim special acquaintance, I must now

refer to a few subjects which I have not treated at all, because I regard them as so special that they would be out of place in this elementary work.

Let me take as my first example the enormous number of subjects which are comprised under "Nature photography." As we are dealing with moving objects, there must be considered both animate and inanimate Nature. The latter may be dismissed at once as the work of the pictorialist.

Turning now to the photography of animate Nature, would it not be unreasonable to expect the inclusion of a subject which is outside the realm of photography *qua* photography? The successful Nature photographer is a man who has made the habits of animals a life study, and his work comprises a multitude of details compared with which the particulars of exposures, plates, lenses, etc., are absurdly trivial.

I was requested to include a chapter on Nature photography from the pen of one of its best exponents; but I had no hesitation in refusing to limit a subject of such wealth of detail to one chapter in my humble little work. It is a "specialty" without doubt, and the amateur who wishes to take up this work will go straight to the special textbooks for information.

Consider, next, such a subject as *mountain-climbing*. Those of my readers who have had the advantage of hearing Mr. Louis J. Steele's lecture "Photography in the High Alps" will agree with me that one scarcely knows which to admire the more, Mr. Steele's beautiful pictures or his athletic skill in taking them. Here, again, one is outside the boundaries of the photography of moving objects, for only an expert climber can acquire the knowledge of mountains and the atmospheric peculiarities associated with them—the essential requisites for successful photography

in addition to the athletic skill obviously necessary. And the same applies equally, or even *a fortiori*, to the photography of *Yachting*. The photographer of sea episodes, with which I may identify Mr. F. J. Mortimer, the editor of *The Amateur Photographer and Photographic News*—if I may be pardoned the identification of a man of such extraordinary versatility even momentarily with one branch—must be exceptionally gifted. Granting his physical capability to withstand in a sea of any roughness the horrors of *mal de mer*—a qualification which I do not in the lowest degree possess—he must combine with a technical knowledge of “instantaneous” photography a profound acquaintance with nautical matters, as will be readily believed by any landsman who has vainly attempted to emulate Mr. Mortimer. Furthermore, one must remember the pictorial possibilities in this sort of photography: a sailor, a skilful photographer, and a pictorialist all in one; surely one may be pardoned the description of yachting as a specialty outside this book.

I will not weary the reader by further multiplying examples, and I can only hope that I have vindicated myself in my segregation of “special” subjects, and that my detailed description of details which are general to “instantaneous” work and specific to the subjects which are commonly encountered and possible to the individual of ordinary attainments will be adequate and of value to beginners in this very fascinating branch of photography.

CHAPTER XX.

PRESS PHOTOGRAPHY.

It is with no little hesitancy that I venture to include this chapter. So many thoroughly comprehensive treatises have appeared on this subject that I feel that not merely can the little I contribute fail to replace them, but it can hardly supplement them to any appreciable extent. But so many of the subjects which I have treated come within the province of press photography, and I have from time to time indicated press possibilities that arise, that I feel it is "up to me" to say a little by way of completeness, though I repeat that I do so with the greatest deference to other writers.

Let me say definitely that I am all against the amateur going in strongly for press work. I am not alluding to the man who, having well digested the articles which have been written for his guidance, will make the most of casual opportunities, but to the man who, having purchased a first-class outfit, wishes to make a regular, if small, income.

What chance can he possibly have in competition against the professional? The latter has every incentive to strenuous work, and his constant practice gives him a skill which no amateur can ever attain, whilst the necessity for making his living spurs him to secure special opportunities

for taking his pictures and disposing of them to illustrated papers.

But even if the amateur is not to be regarded as a serious competitor, why should he be a competitor at all? I don't wish to appear ridiculously sentimental; but, after all, is it fair to increase the difficulties in the way of a man's livelihood? Goodness knows the competition is severe enough. At any big event in the world of sport, you cannot count upon your fingers the number of professionals at work. At the Inter-'Varsity Sports at Queen's Club, there is a little chained-off enclosure near the start of the mile race which I have christened "Pressmen's Corner." I have counted ten or twelve men at this point alone, whilst a few others are at work elsewhere in the field. Fourteen men to divide up the pictures which have a very transitory interest! It is true that the number of papers which take illustrations has largely increased during the last few years, and is almost weekly increasing; but I believe that the supply, the number of workers, also increases out of all proportion.

But I must admit that an amateur may very often have an opportunity to obtain some important pictures when for some reason no professionals are present. Furthermore, it not unfrequently occurs that the amateur *qua* amateur is given a freedom which, through prejudice, is denied the professional. In certain of the higher sporting circles the professional pressman is regarded with some disdain. He is accused, *inter alia*, of adopting any methods, however undesirable, to obtain the results he wants. I have a very deep respect for the professional pressman, and I am glad to say that, despite the almost pardonable incentive he has to get his pictures regardless of others, it is in my experience very seldom indeed that one is to be found failing to play

the game like a sportsman. But if, as I have said, some prejudice does exist, the amateur in such circumstances can hardly be blamed for taking advantage of his unique opportunity.

I always regard a sporting picture—and sporting pictures constitute an enormous majority of press illustrations—from one or two standpoints. It may, on the one hand, be a representation of a very famous event in the world of sport—an international match, an attempt on a record, a famous rowing eight, and so on, acceptable for its personal interest alone, however tame the picture is, photographically considered.

The other class of picture scores on account of its intrinsic merit. "A line-out" in the match between Sunbridge Hairdressers A Team and Bridlington Juniors will not appeal to an editor of a topical paper in the slightest degree. But should the photograph show some intensely interesting point in football, it is reserved for another market, where its lack of general interest will be no bar to its success. So it is, of course, in every branch of sport. If you are photographing at the Amateur Championships, you aim at a simple result. If the event is a boys' race, you may just as well throw a plate away as photograph, unless you are going to obtain a picture of exceptional merit. The illustration of the runners facing page 17 is a case in point. It is only a boys' race, but it scores on account of the exceptional grouping and the appearance, as yet comparatively uncommon, of a large number of figures all rendered sharply. Many years ago, in particularly beautiful weather, I took some photographs of a friend golfing—a very ordinary player with a handicap of 12. The photographs were really exceptional, and I was surprised and disappointed to find that

editors displayed no eagerness to exchange cheques for the privilege of printing them. Some time later a discussion arose regarding the speed of golf and cricket balls from a drive. I hunted out my old pictures, which included some of the fastest shutter-work I had ever attempted, showing the ball at the instant of impact with the club, the ball a few inches from the tee, the driver in all stages of his swing, and they were at once accepted.

As a contrast to this, I heard one morning that Cambridge were playing a team from the Oxford and Cambridge Golfing Society at Mildenhall. A day on the links appealed to me as of greater benefit to my health than one spent in the laboratories, and I had the enterprise to make a little expedition and to take more than a dozen photographs, all of which, though very ordinary as "instantaneous" photographs, were at once accepted because they were portraits of celebrities in the world of golf.

Again, one morning at Stamford Bridge running-ground I met Mr. Kerr and Mr. Walker practising for the Amateur Championships. The light was too bad for fast-shutter work, but I persuaded the rivals to pose for me in an exceptional manner—Mr. Walker on the mark and Mr. Kerr holding the pistol. They were very much in the public eye just then, and the most commendable camaraderie thus displayed by them turned a commonplace subject into a positively unique one—an ideal one for any man with press aspirations.

I have given these few examples, rather obvious ones perhaps, to illustrate the possibilities of any ordinary amateur, and I will enhance any value they may possess by advising all would-be "amateur pressmen" to join a press agency, so that no opportunity will ever be wasted. Prints

are sent at once to the agency, whose managers are in touch with all illustrated papers, besides possessing an expert acquaintance with the special requirements of different periodicals. They are able to place photographs with a celerity quite impossible to the amateur himself, merely deducting their well-earned commission of 25 per cent., or 33 per cent. on all pictures sold.

If you have any skill or expert knowledge of any particular subject, adapt your photography to the utmost extent. There is a growing demand for illustrations in books to be photographs, not drawings, and collaboration in this way may be not only a fascinating occupation but a very profitable one.

Moreover, if you happen to be one of those who are endowed by Nature (according to Dogberry) with the knack of writing, you can often take a series of photographs and build up an article around them.

That you will take an intelligent interest in any subject you are illustrating is obvious ; but, although there is not the slightest need to be an active performer, you should do more than acquire merely the jargon of the subject in question ; you should understand the spirit. I am speaking more particularly of sport, for your sporting picture may fail to attract on its own merits when it catches the editor's eye at once by a pointed title or a pithy description. I have already described how the first-class sporting picture appeals from its personal interest—"The Finish of the Hundred Yards A.A.A. Championships" ; "England *versus* Wales" ; "Two Famous Pairs of Brothers, the Dohertys and the Allens" ; "Jabez Wolffe swimming the Channel"—these simple labels will do without adornment. But with your sporting subject of the second class I described, you must

help it along a bit, and that is where your knowledge of the game at once suggests an apt title.

How tired one gets of "An Exciting Moment"—this platitude usually of a football match in which surely *every* moment is exciting to somebody; of "A Close Finish"—the usual unpretentious title appended to the sprint, whether the finish is, for a sprint, a close one or not; of "A Good Jump" or "Well Over," when more often than not the jump is by no means good, and we have only the photographer's guarantee that the jumper *is* over! One can scarcely fail to give offence by the impertinent labelling of a photograph with a self-evident title such as "Hockey" or "Swimming," and how absurd to call your cycling picture "The Last Lap" when the irritating crawling common to all laps except the last is only too obvious! By way of contrast let me mention a few titles, which have actually appeared in the press, to serve as suggestions.

Football.—"A Clever Swerve"; "Passing among the 'Threes'"; "A Timely Pass"; "A Grand Tackle"; "Ball's away!"; "Claiming a Foul"; "Man hurt"; "Jump for it, Forwards"; "Feet, Feet, Forwards."

Golf.—"Bunkered, well out"; "How fast a ball leaves the tee."

Cricket.—"A Crisp Cut for Four"; "Jumping out to Drive"; "A Leg Glance."

Athletics.—"Off"; "What Need for Wings?" (jumping); "A Critical Moment in a Big Jump" (but be sure the moment *is* critical, and the jump a big one); "A Perilous Passage" (steeplechase).

Years ago one often saw a series of drawings of some sport with well-known quotations, usually poetical, as descriptions. If you are a Shakespearian student, why not

do the same with a series of photographs? Your ingenuity will, I am sure, gain acceptance for a series of comparatively mediocre pictures. For example, your photograph of a man at Rugby football evidently employing more haste than gentleness, *may* score with "A Rough Tackle," but it positively excels with:—

"Oh it is excellent to have a giant's strength ;
But it is tyrannous to use it like a giant."

Measure for Measure.

Finally, some really striking results which are not interesting from any personal merit may often be very acceptable to manufacturers, for so long as detail is present to a full extent, nothing advertises a lens or a plate so much as a thoroughly well-exposed high-speed photograph, no matter how much the subject itself is to be deprecated. I have said a little more on this topic in Chapter XIX., where I have employed the expression "posed pictures," and have only referred to it again to complete the enumeration of the ways in which an amateur can make shutter-work pay.

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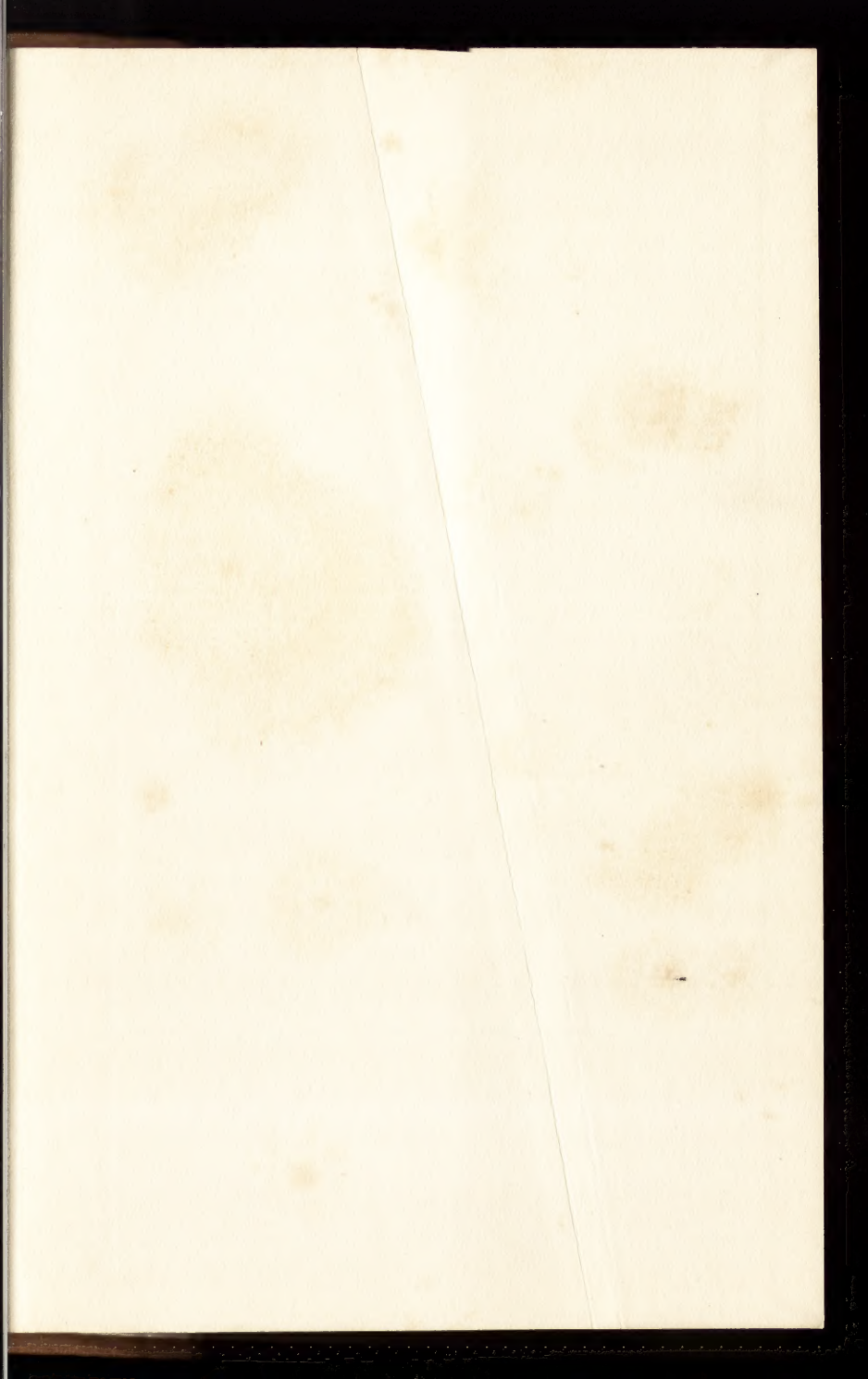
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